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COMPLETED

FLOOD INSURANCE STUDY

ORIGINAL

FOND DU LAC COUNTY, WISCONSIN

UNINCORPORATED AREA

REVISED:

MARCH 18, 1986

Federal Emergency Management Agency

COMMUNITY NUMBER - 550131

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NOTICE TO
FLOOD INSURANCE STUDY USERS

This Flood Insurance Study was revised on March 18, 1986. Users should refer to the Addendum (Section 8.0) of this text for further information.

Part or all of this Flood Insurance Study may be revised at any time. Users are, therefore, cautioned that a published map revision (i.e., a revised Flood Insurance Rate Map) may not include a reprinting of the text, tables, and/or profiles, resulting in a discrepancy between the revised map and the original study components. It is the responsibility of the user to consult with community officials to obtain the most current Flood Insurance Study components.

Initial Flood Insurance Study Effective Date: January 1982

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgements	1
1.3	Coordination	1
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	6
2.3	Principal Flood Problems	7
2.4	Flood Protection Measures	8
3.0	ENGINEERING METHODS	8
3.1	Hydrologic Analyses	15
3.2	Hydraulic Analyses	18
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	23
4.1	Flood Boundaries	23
4.2	Floodways	25
5.0	INSURANCE APPLICATION	32
5.1	Reach Determinations	32
5.2	Flood Hazard Factors	33
5.3	Flood Insurance Zones	33
5.4	Flood Insurance Rate Map Description	34

BEST COPY AVAILABLE

TABLE OF CONTENTS (Continued)

		Page
6.0	OTHER STUDIES	34
7.0	LOCATION OF DATA	40
8.0	ADDENDUM (Revised: March 18, 1986)	40
8.1	Purpose	40
8.2	Acknowledgments	40
8.3	Scope	41
8.4	Hydrologic and Hydraulic Analysis	41
8.5	Floodways	43
8.6	Other Studies	43
9.0	BIBLIOGRAPHY AND REFERENCES	43

FIGURES

Figure 1 -	Vicinity Map	3
Figure 2 -	Projected Water-Surface Elevations at Douglas Road Bridge on Silver Creek	9
Figure 3 -	Projected Water-Surface Elevations Upstream of County Highway KKK Bridge	9
Figure 4 -	Projected Water-Surface Elevations at County Highway D Bridge	10
Figure 5 -	Projected Water-Surface Elevations at U.S. Highway 151 Bridge	10
Figure 6 -	Projected Water-Surface Elevations at Minnesota Avenue Bridge	11
Figure 7 -	Projected Water-Surface Elevations at County Highway T Bridge	11
Figure 8 -	Projected Water-Surface Elevations at County Highway D Bridge	12
Figure 9 -	Projected Water-Surface Elevations at Prairie Road Bridge	12

BEST COPY AVAILABLE

TABLE OF CONTENTS (Continued)

Figure 10 - Projected Water-Surface Elevations on State Highway 23 Bridge 13

Figure 11 - Projected Water-Surface Elevations at Long Lake Dam 13

Figure 12 - Projected Water-Surface Elevations at County Highway Y Bridge 14

Figure 13 - Projected Water-Surface Elevations at Schrauth's Mill Dam 14

Figure 14 - Floodway Schematic 32

TABLES

Table 1 - Flooding Sources 4

Table 2 - Summary of Elevations 18

Table 3 - Summary of Discharges 19

Table 4 - Floodway Data 25

Table 5 - Flood Insurance Zone Data 35

Table 6 - Revised Summary of Dishcharges 42

EXHIBITS

Flood Profiles

Milwaukee River	Panel	01P
East Branch Milwaukee River	Panel	02P
West Branch Milwaukee River	Panel	03P
Silver Creek	Panels	04P - 05P
Parsons Creek	Panel	06P
Clamshell Creek	Panel	07P
West Fork Clamshell Creek	Panel	08P
Poplar Creek	Panel	09P
Anderson Creek	Panel	10P
Mosher Creek	Panel	11P
Supple Creek	Panel	12P
Luco Creek	Panel	13P

BEST COPY AVAILABLE

TABLE OF CONTENTS (Continued)

Taycheedah Creek	Panels	14P - 15P
East Branch Fond du Lac River	Panels	16P - 17P
West Branch Fond du Lac River	Panels	18P - 19P
West Branch Rock River	Panel	20P
South Branch Rock River	Panel	21P
De Neveu Creek	Panels	22P - 23P

Flood Boundary and Floodway Map Index
Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

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FLOOD INSURANCE STUDY

COUNTY OF FOND DU LAC, WISCONSIN
UNINCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Fond du Lac County, Wisconsin, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Unincorporated Areas of Fond du Lac County to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Howard Needles Tammen and Bergendoff for the Federal Emergency Management Agency, under Contract No. H-3968. Approximate flood boundaries for the Eldorado Marsh (along West Branch Fond du Lac River); the swampy area in the Horicon National Wildlife Refuge along the southern county boundary, east of the City of Waupun; and the upstream portion of DeNeveu Creek were determined by Gannett, Fleming, Corddry and Carpenter, Inc., under contract to the Federal Emergency Management Agency. This study was completed in May 1979.

1.3 Coordination

The selection of the county base map and the identification of streams of detailed and approximate study were completed in a meeting attended by officials of the Fond du Lac County Planning Department and personnel of FEMA, the Wisconsin Department of Natural Resources (DNR) and the Study Contractor on March 11, 1976. Hydrologic analyses and flood profiles were

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coordinated by the Study Contractor with those developed or being developed concurrently by the U.S. Geological Survey (USGS), Owen-Ayres and Associates, the U.S. Army Corps of Engineers (COE), and the Southwestern Wisconsin Regional Planning Commission (SEWRPC).

Hydrologic determinations were submitted to, and concurred with the Fond du Lac County Planning Department, the Wisconsin DNR, the SEWRPC, the USGS, the Soil Conservation Service (SCS), the COE, and the East Central Wisconsin Regional Planning Commission.

Preliminary flood boundary and floodway work maps were presented by the Study Contractor and reviewed by representatives of the Fond du Lac County Planning Department and the Wisconsin DNR at a meeting held on November 28, 1977.

On November 20, 1980, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Fond du Lac County, Wisconsin. Not included are the incorporated municipalities of Fond du Lac, North Fond du Lac, Ripon, Waupun, Campbellsport, Fairwater, Brandon, Oakfield, Rosendale, Eden, Mt. Calvery, and St. Cloud. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction through 1982.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and the unincorporated areas of Fond du Lac County. The flooding sources studied are listed in Table 1.

Portions of the following streams were studied by approximate methods:

Silver Creek
South Branch Rock River
West Branch Rock River
West Branch Fond du Lac River
East Branch Fond du Lac River
Parsons Creek
Forest Lake
South Branch Manitowoc River
Campground Creek
Willow Creek
Grand River
Taycheedah Creek
Milwaukee River
West Branch Milwaukee River
East Branch Milwaukee River
Lake Fifteen Creek
Virgin Creek
Sheboygan River
De Neveu Creek
Seven Mile Creek
Henderson Creek

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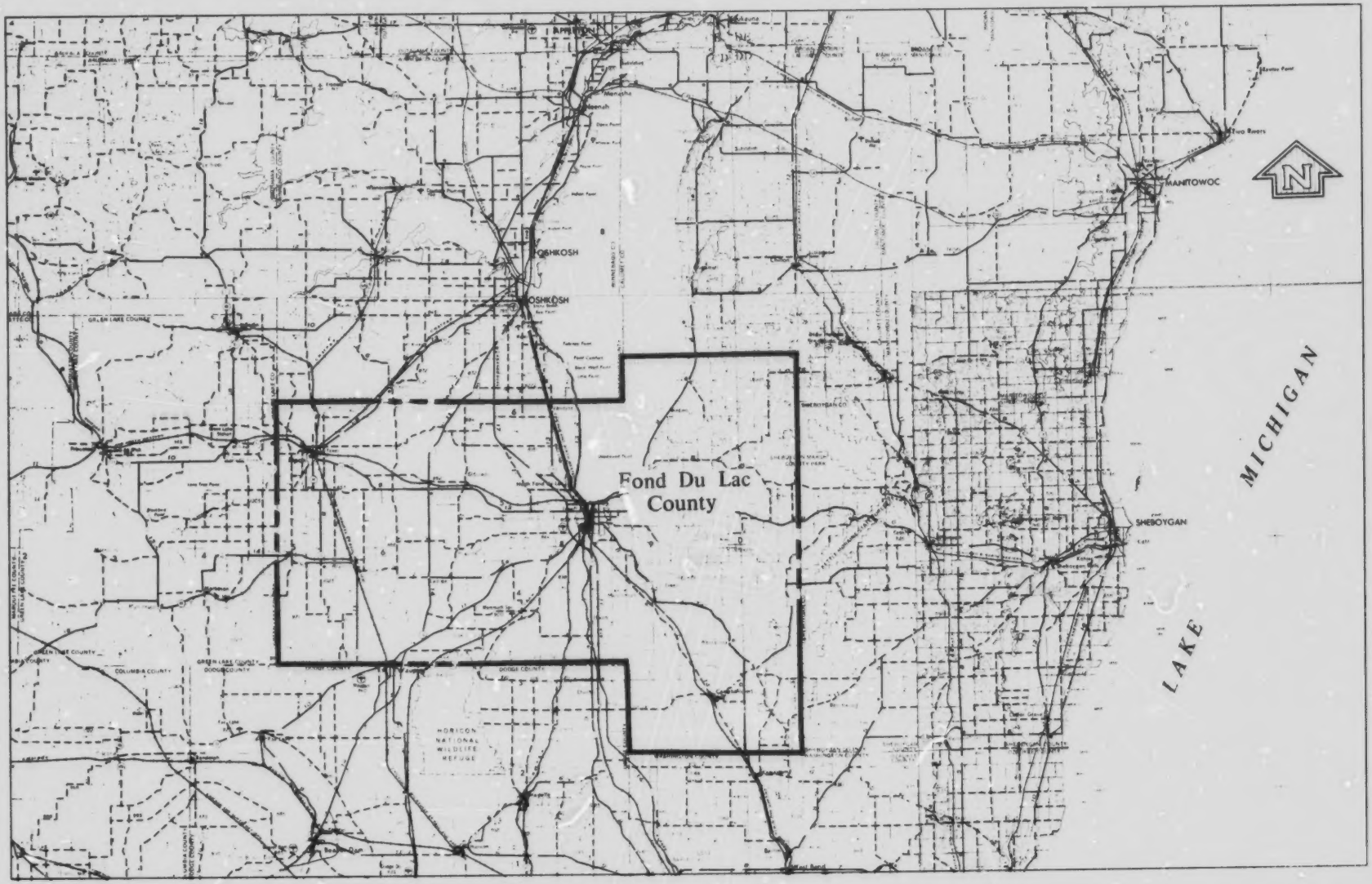

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

APPROXIMATE SCALE
10 0 10 20 30 MILES

VICINITY MAP

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TABLE 1: FLOODING SOURCES

DETAILED FLOODING SOURCES	DESCRIPTION OF STUDY LIMITS	
	FROM	TO
SILVER CREEK	County limits Ripon corporate limits	Ripon corporate limits Willow Road
SOUTH BRANCH ROCK RIVER	Confluence with West Branch Rock River	Waupun corporate limits
WEST BRANCH ROCK RIVER	County limits	Mile 13.96
WEST BRANCH FOND DU LAC RIVER	City limits Mile 15.80	State Highway 23 Mile 17.54
EAST BRANCH FOND DU LAC RIVER	City limits	Mile 14.67
PARSONS CREEK	Confluence with East Branch Fond du Lac River	Mile 2.0
CLAMSHELL CREEK	Lake Winnebago	Mile 1.76
WEST FORK CLAMSHELL CREEK	Confluence with Clamshell Creek	Mile 0.6
POPLAR CREEK LAKE WINNEBAGO	Lake Winnebago	Mile 1.03
ANDERSON CREEK	Lake Winnebago	Mile 3.82
MOSHER CREEK	Lake Winnebago	North Fond du Lac village limit
	North Fond du Lac village limit	U.S. Highway 41

TABLE 1: FLOODING SOURCES (CONTINUED)

DETAILED FLOODING SOURCES	DESCRIPTION OF STUDY LIMITS	
	FROM	TO
SUPPLE CREEK	North Fond du Lac village limit	Fond du Lac city limit
LUCO CREEK	Lake Winnebago	Confluence with Taycheedah Creek
TAYCHEEDAH CREEK	Lake Winnebago	Mile 9.55
MILWAUKEE RIVER	Fond du Lac County line	Campbellsport village limits
	Campbellsport village limit	Mile 89.12
WEST BRANCH MILWAUKEE RIVER	Fond du Lac County line	Mile 7.7
EAST BRANCH MILWAUKEE RIVER	Mile 92.0	Fond du Lac County line
LAKE WINNEBAGO	Shoreline within Fond du Lac County	

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2.2 Community Description

Fond du Lac County is located in east-central Wisconsin at the southern end of Lake Winnebago. It is 54 miles northwest of Milwaukee and 51 miles northeast of Madison. The eastern county line is about 20 miles west of Lake Michigan. The county is surrounded by the Counties of Winnebago and Calumet to the north, Dodge and Washington to the south, Green Lake to the west, and Sheboygan to the east. U.S. Highways 42, 45, and 151 cross the county and intersect in and near the City of Fond du Lac. The 1970 population of the unincorporated areas was 36,229, an increase of 15 percent over the 1960 population (Reference 1).

The climate of the county exhibits a tendency for extremes and in general is marked by diurnal and seasonal variations typical of the mid-continental area. Summers are hot, relatively short, and humid. The month of June has the greatest number of thunderstorms and is the rainiest month of the year. The relatively cold and long winter season usually gives way to a mid-winter thaw in January; but the spring thaw occurs in late March or early April. The spring thaw is characteristically gradual with a mixture of cold and warm days. The greatest rainfall amount recorded in 24 hours at Fond du Lac was the 5.30 inches that fell on August 4, 1924.

Natural features associated with the major river systems of the study area can be described collectively in two major groups - east and west of the Niagara Escarpment. The glacial advance from Green Bay to slightly beyond the Horicon Marsh cut into the soft Maquoketa Shale, in the central part of the county, to form the broad valley of Lake Winnebago and Horicon Marsh. The Silurian dolomite, to the east, resisted erosion and resulted in the formation of the ledge known as the Niagara Escarpment.

The area to the east of the ledge drains into Lake Michigan by the Manitowoc, Sheboygan, and Milwaukee Rivers and their tributaries. Geologically, the watersheds are characterized as youthful due to circuitous, underdeveloped, and inefficient channel systems which will stabilize in time with erosion and weathering. The topography in the northern part of this area is gently rolling with numerous hills and drumlins and some scattered level valleys. The southern part of this area consists of level to sloping outwash plains and the moraine area included in the Kettle Moraine State Forest. The Kettle Moraine area is a mass of ridges, kames, and kettles, many of which form ponds and lakes. Average land slopes are less than five percent. Soils in the eastern area are approximately 75 percent Hydrologic Soils Group B, with the remaining 25 percent predominately Group D (Reference 2). Vegetative cover is primarily crop and pasture land with small areas of forest. The five townships along the eastern edge of the county and the Township of Eden contain major wetland areas amounting to more than 40 percent of the county's total wetland acreage.

Immediately west of the Niagara Escarpment, the large flat plain in the north-central part of the county drains into Lake Winnebago by the Fond du Lac River, De Neveu, Taycheedah, Anderson Creeks and other small streams and tributaries. Sandy Beach Creek, Minawa Beach Creek, and Taycheedah Creek have streambed slopes of 30 to 100 feet per mile where they flow down the ledge toward Lake Winnebago. This central plain area contains only about five percent of the county's wetland acreage. Soils in

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this area immediately surrounding Lake Winnebago and extending into the central and south-central part of the county are about 75 percent Hydrologic Soil Group C, 20 percent Group D, and five percent Group B. West of the plain, the topography becomes gently rolling and is drained by Silver Creek and the Grand River in the north and by the Rock River and its tributary streams in the south. The Rock River system drains into the Mississippi River. Soils in the western part of the county are generally 75 percent Hydrologic Soil Group B and 25 percent Group D. Land slopes in the western region are generally less than five percent. Vegetative cover is mostly crop and pasture land with small areas of forest and some major wetland acreages, especially within the Towns of Lamartine, Eldorado, and Waupun.

The most significant development pattern in Fond du Lac County is the rapid spread of urban residential developments into rural areas. Most of this development is within unincorporated communities, along highways, and in locations just outside of incorporated areas. Industrial and commercial development is primarily centered within incorporated communities. However, unincorporated areas just outside the City of Fond du Lac and the City of Ripon have experienced some industrial and commercial development and represent the greatest potential for future development of this type within the study area. Although agriculture is the primary economic base for the study area, the farm population has exhibited a decreasing trend.

Pasture, woodlands, wetlands, and recreational uses occupy the majority of the county's flood plain area. Croplands, roads, and farmsteads occupy most of the remaining flood plain area. Existing urban development in unincorporated communities, in areas adjacent to incorporated communities, and in scattered residential developments represents a very small percentage of flood plain land use within the study area. The strong trend toward future development of this type could increase this percentage unless sound flood plain management measures are utilized.

Principal Flood Problems

The history of flood problems in Fond du Lac County has been traced back to 1851 by the SCS. Floods causing the most significant damage occurred in 1869, 1902, 1905, 1912, 1915, 1924, 1937, 1949, 1960, and 1966. The 1924 flood on the Fond du Lac and Milwaukee Rivers is considered to be approximately equal in magnitude to the 100-year event. During the flood, minor damage to livestock, crops, bridges and industrial plants was reported along the Milwaukee River system in Fond du Lac County. Severe agricultural cropland damage was noted along the Fond du Lac River.

Few records of flooding exist for the unincorporated areas of the county, but problems have been indicated in many areas. Hardest and most frequently hit by floods are low-lying agricultural croplands. Silt deposition on crops is a common cause of damage.

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Most of the flooding has occurred in the months of February through August. The major floods have generally occurred due to spring snowmelt, ice jams, and less frequently by intense rainfalls in summer and autumn.

Soils within the study area are generally moderate to slowly permeable causing high runoff and increasing flood risk. The valuable wetland areas of the county serve as natural reservoirs, suppress the effects of intense rainfall and rapid runoff, and prevent peak flows. The Milwaukee River watershed particularly has a large capacity for floodwater storage in lakes and wetlands. Natural obstructions to flood flows such as trees and brush along stream banks exist in many of the watersheds. These tend to impede flood flow and increase flood height. Debris collects at restrictions and can finally break loose causing a wall of water to surge downstream, sometimes exceeding the structural capacity of bridges. Some bridges in the county provide only narrow waterway openings which cause higher upstream water levels and are more subject to debris blockage. Figures 2 through 13 illustrate flood levels at various locations.

2.4 Flood Protection Measures

Within Fond du Lac County, there are six dams along the Milwaukee River watershed; these dams, however, do not significantly affect flood flows. Several miles of the perennial stream system of the Milwaukee River watershed have been intentionally modified in an attempt to improve their hydraulic characteristics. Channel improvements may consist of straightening, deepening, increasing the cross sectional area, improving the horizontal gradeline, or diking, and generally involve all five phases. All of these phases result in increased velocity and decreased time of concentration.

In 1942, the COE determined that the cost of flood protection for the Fond du Lac River watershed would exceed the prospective benefits; therefore, no significant flood protection exists for this river system. Significant structural flood protection measures have not been implemented and are not planned for the remainder of the unincorporated areas. However, as new bridges are constructed, a detailed analysis of flood flow conditions is required for review by the Wisconsin DNR.

The development of a sound flood plain management program for Fond du Lac County will be accelerated with the completion of this Flood Insurance Study and the adoption of a flood plain zoning ordinance.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period

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FIGURE 2 - Projected water-surface elevations at Douglas Road bridge on Silver Creek (100-Year is 929, 500-Year is 930).

FIGURE 3 - Project water-surface elevations upstream of County Highway KKK bridge at mile 16.50 on the West Branch of the Fond du Lac River (100-Year is 864, 500-Year is 868).

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FIGURE 4 - Projected water-surface elevations at County Highway D bridge on the West Branch of the Rock River (100-Year is 874, 500-Year is 876).

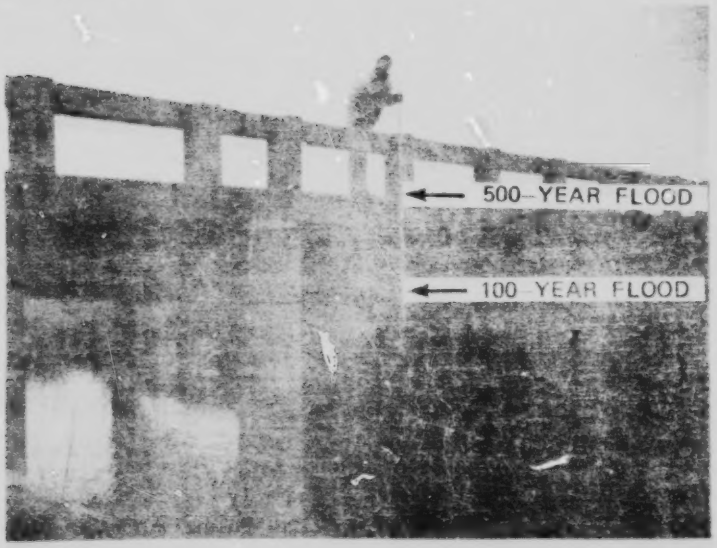

FIGURE 5 - Projected water-surface elevations at U.S. Highway 151 bridge on the South Branch of the Rock River (100-Year is 872, 500-Year is 875).

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FIGURE 6 - Projected water-surface elevations at Minnesota Avenue bridge on Anderson Creek (100-Year is 772, 500-Year is 775).

FIGURE 7 - Projected water-surface elevations at County Highway T bridge (mile 4.33) on the West Branch of the Fond du Lac River (100-Year is 772, 500-Year is 773).

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FIGURE 8 - Projected water-surface elevations at County Highway D bridge on the East Branch of the Fond du Lac River (100-Year is 830, 500-Year is 832).

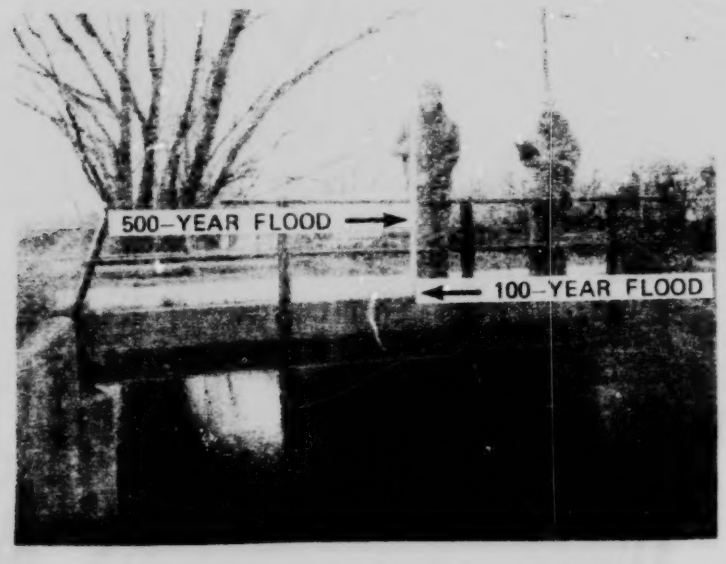

FIGURE 9 - Projected water-surface elevations at Prairie Road bridge on Luco Creek (100-Year is 752, 500-Year is 754).

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FIGURE 10 - Projected water-surface elevations at State Highway 23 bridge on Taycheedah Creek (100-Year is 769 500-Year is 770).

FIGURE 11 - Projected water-surface elevations at Long Lake Dam on the East Branch of the Milwaukee River (100-Year is 1010, 500-Year is 1011).

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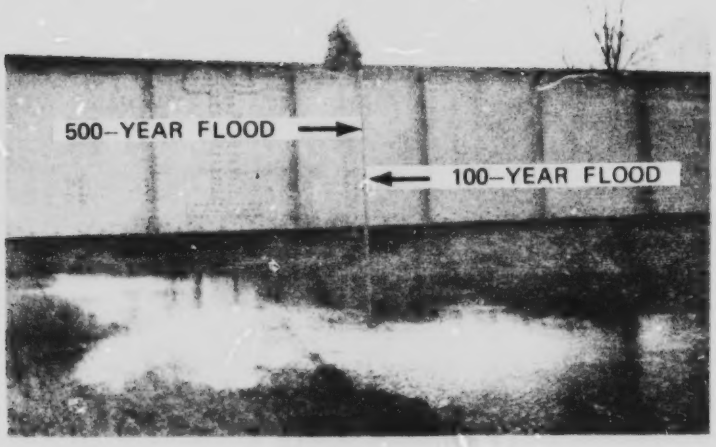

FIGURE 12 - Projected water-surface elevations at County Highway Y bridge (mile 84.69) on the Milwaukee River (100-Year is 975, 500-Year is 977).

FIGURE 13 - Projected water-surface elevations at Schrauth's Mill Dam on the West Branch of the Milwaukee River (100-Year is 979, 500-Year is 980).

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(recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten), and for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

The Comprehensive Analysis by the SEWRPC (Reference 3) and the resultant flood flows are the basis for the discharges used for the hydrologic analysis of the East Branch Milwaukee River and West Branch Milwaukee River and the Upper Milwaukee River. Gage records are available at Milwaukee for the Milwaukee River, however, watershed characteristics at the gaging station are significantly different from those in the upper reaches of the watersheds studied here.

The analysis by the SEWRPC was carried out by synthetic modeling of flood flows primarily for snowmelt events. The characteristics and magnitude of floods generated by melting snow were determined by assuming that soils were frozen during the melting period. All hydrologic subareas were assigned a runoff curve number of 100 (impervious soils) to adjust the model to these conditions. Potential melt periods, snowmelts, and snowpacks were determined by a systematic search of historic records. Further statistical analysis demonstrated that the 100-year recurrence interval flood for the total Milwaukee River watershed could be entirely a snowmelt event.

Floods produced by rainfall were determined to be critical for only minor subwatersheds. These floods were synthesized by using a 24-hour rainstorm distribution based on information published by the U.S. Weather Bureau (Reference 4) and on rainfall patterns observed during major storms in the vicinity of the City of Milwaukee. Analysis of the 100-year summer rainfall event on a representative watershed resulted in a flood peak with an indicated recurrence interval of only about 20 to 25 years.

Floods for future (1990) land use conditions were synthesized for snowmelt and snowmelt-rainfall events using the same rainfall amounts and snowmelt

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volumes that were used to develop flood flows for present land use conditions. The effects of urbanization on snowmelt and snowmelt-rainfall floods in the Milwaukee River were calculated to be minimal.

The peak flood flows derived by the SEWRPC were compared with flows derived through application of a regional flood estimation technique developed by the USGS (Reference 5) at the State Highway 67 bridge on the Milwaukee River. In addition, the SEWRPC compared its flows with flows derived from an earlier USGS regional technique (Reference 6) at 16 locations in the watershed. In both cases, it was determined that application of regional flood analysis methods may be expected to yield peak flood flows which are as much as 50 percent below the values derived from the SEWRPC's flood flow simulation model. The difference can be attributed to the fact that the SEWRPC model permits consideration of more factors that affect flood flows than do the regional flood analysis techniques, including variations in the capacity of channel reaches, soils, and land uses.

The SEWRPC flood-frequency relation has been extrapolated to the 500-year recurrence interval on log-probability paper.

The flows for the East Branch Fond du Lac River and West Branch Fond du Lac River are based on data from the Flood Insurance Study for the City of Fond du Lac (Reference 7). This report utilized information from a Flood Plain Information Report (Reference 8). This information included drainage areas, unit hydrographs, 100-year flood peaks, and discharge-frequency curves. A drainage area-discharge relationship was used to determine the runoff peaks at the upstream locations.

The flood discharges obtained from these sources were compared to flows obtained through use of the USGS regional flood estimation technique (Reference 5), and to flows resulting from a log-Pearson Type III analysis (Reference 9) with zero skew, utilizing 15 years of East Branch Fond du Lac River and West Branch Fond du Lac River gaging station records (Reference 5). All three methods produced similar flows at the corresponding recurrence intervals.

The flows for West Branch Rock River and South Branch Rock River have been developed using the hydrologic method described by the U.S. Water Resources Council (Reference 9). Records from the gaging station on the South Branch at Waupun, and from the gaging station on the West Branch Rock River near Waupun, were used in the log-Pearson Type III analysis with zero skew. Twenty-one consecutive years of gage data were available for both analyses (Reference 5). The flows for the West Branch Rock River below the confluence were determined by plotting the flows for West Branch Fond du Lac River and South Branch Fond du Lac River above the confluence on a unit runoff versus drainage area graph, and extrapolating to the total basin drainage area.

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No published or unpublished flow or flood data exists for Clamshell, West Fork Clamshell, Taycheedah, Luco, and Parsons Creeks. Two methods of hydrologic analysis were utilized to determine the peak discharge-frequency relationships for these streams. The first method utilized the flood frequency equations published by the USGS (Reference 5). These equations were developed by using a multiple-regression analysis to define the relationship between flood discharge and 13 independent basin characteristics. This analysis defined the regression coefficients and regression constant, evaluated the significance of each basin characteristic, and provided a standard error of estimate. Data from 160 continuous record and 115 crest-stage partial-record gaging stations in Wisconsin and adjoining states were considered in developing the relationships.

The second method consisted of the development of drainage area-discharge relationships for gaged streams on similar watersheds. Using log-Pearson Type III analysis with zero skew, gage records from these similar watersheds were compared and plotted versus drainage area on log-log paper to yield a family of frequency-discharge curves for basins similar to those associated with streams studied in this report. Gage records and basin characteristics were obtained from a report by USGS (Reference 5). Both methods produced similar results for the streams studied.

No published or unpublished data exists for Poplar, Anderson, Mosher, Supple, and Silver Creeks. Three methods of hydrologic analysis were utilized to determine the peak discharge-frequency relationships for these streams. The first two methods are the USGS method, and the similar watershed method, as discussed above. The third method was developed by the SCS (Reference 10). The SCS method takes into consideration watershed area soil types, cover and land use types, slope, flow length, and surface roughness. The procedure requires the calculation of a runoff curve number based on hydrologic soil groups and land use, and calculation of a time of concentration using the parameters of slope, land use, and velocity. These calculated values are then used to find the peak discharge per inch of runoff per unit area and the runoff depths for the 25-, 50-, and 100-year floods created by the rainfall from a 24-hour Type II storm distribution. Flood flows at the desired frequencies are then found by multiplying the peak discharge per inch of runoff per unit area by the runoff depth and the watershed area. The 10-year and 500-year peak discharge flows are extrapolated from a plot of the calculated values, using log-log paper.

Streams which flow into Lake Winnebago are influenced at the mouths by lake levels determined for the various recurrence intervals. Elevations for Lake Winnebago for the 10-, 50-, 100-, and 500-year flood intervals were obtained from the City of Fond du Lac Flood Insurance Study (Reference 7). The Lake Winnebago levels are shown in Table 2.

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TABLE 2 - SUMMARY OF ELEVATIONS

LOCATION	ELEVATIONS (NGVD) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LAKE WINNEBAGO	748.85	749.25	749.50	750.15

The hydrologic analyses for this study reflect current conditions in the watersheds of the streams. Major land use changes or channel modifications are not anticipated in the near future.

For Silver Creek and West Branch Fond du Lac River, discharges in Table 3 are reduced for the downstream reaches due to the storage effect of marsh areas. For the Milwaukee River, discharges in the lower reaches are reduced by the storage effect of Campbellsport Dam.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 3.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

Cross section data for the streams were obtained by field survey except for the East Branch Fond du Lac River and the West Branch Fond du Lac River, where cross section data were obtained from the COE (Reference 8). Cross sections were located at close intervals above the below bridges and culverts in order to compute any significant backwater effects. All bridges were identified by field inspection. Only several small farm-use and foot bridges were evaluated as unstable under flood conditions and insignificant in producing backwater effects.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map.

Roughness factors were determined by field inspection at each section for both the channel and the flood plain except for the East Branch Fond du Lac River and the West Branch Fond du Lac River where values were obtained from the COE (Reference 8). Roughness values on the streams for the main channel varied from 0.020 to 0.046, and values in the flood plain ranged from 0.030 to 0.120. Values were held constant for all floods.

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TABLE 3 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SILVER CREEK					
At Fond du Lac County boundary	36.80	1,160	1,840	2,190	3,020
At Douglas Road	22.20	790	1,140	1,290	1,620
At Silver Creek Road	14.60	780	1,400	1,800	2,800
SOUTH BRANCH ROCK RIVER					
At confluence with West Branch Rock River	69.70	1,453	2,982	3,843	6,424
WEST BRANCH ROCK RIVER					
At State Highway 49	114.20	2,512	4,796	5,938	9,707
At confluence with South Branch Rock River	44.50	970	2,173	2,889	5,142
WEST BRANCH FOND DU LAC RIVER					
At State Highway 23	85.40	1,200	1,750	2,000	2,650
Upstream of Eldorado Marsh	56.00	1,260	2,550	3,300	5,500
EAST BRANCH FOND DU LAC RIVER					
At the City of Fond du Lac corporate limits	77.90	1,600	2,700	3,300	4,950
At Hickory Road	62.00	1,500	2,600	3,200	4,750
PARSONS CREEK					
At County Highway B	7.55	680	1,420	1,850	3,150

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TABLE 3 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CLAMSHELL CREEK (including West Fork Clamshell Creek)					
At mouth	3.80	305	645	840	1,430
At Lincoln Road	3.20	282	590	770	1,300
POPLAR CREEK					
At mouth	4.10	445	835	1,040	1,630
ANDERSON CREEK					
At mouth	8.40	655	1,270	1,610	2,600
At Chicago and North Western Railroad	7.10	580	1,200	1,540	2,600
At State Highway 175	5.80	590	1,140	1,430	2,300
MOSHER CREEK					
At mouth	4.01	400	820	1,050	1,760
At Southern Village of North Fond du Lac corporate limits	3.20	320	670	860	1,500
At U.S. Highway 41 east frontage road	2.30	295	580	720	1,200
SUPPLE CREEK					
At Highway 175 bridge	2.30	260	510	640	1,100

TABLE 3 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TAYCHEEDAH CREEK (including Luco Creek)					
At mouth	17.10	1,640	3,330	4,250	7,100
At confluence of Unnamed Tributary to State Highway 23	12.90	1,420	2,900	3,700	6,200
At downstream crossing of County Highway T	6.60	740	1,580	2,050	3,530
At County Highway UU	4.30	530	1,080	1,370	2,260
At upstream crossing of County Highway T	3.10	425	880	1,140	1,940
MILWAUKEE RIVER					
At Fond du Lac County boundary	70.80	1,661	2,500	2,928	3,900
At U.S. Highway 45	53.40	1,619	2,900	3,563	5,400
At Campbellsport Dam	48.00	1,863	3,200	3,922	5,600
At Private Bridge located at River Mile 88.20	46.31	1,654	2,850	3,473	5,300
EAST BRANCH MILWAUKEE RIVER					
At County Highway F	24.50	121	380	556	1,270
WEST BRANCH MILWAUKEE RIVER					
At confluence with Milwaukee River	119.50	3,904	6,400	7,667	11,100
At Rustic Drive	48.70	2,245	3,900	4,740	7,100
At Town Road	35,80	1,635	2,800	3,400	5,900

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Water-surface profiles were developed using the HEC-2 computer step-backwater model (Reference 11). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Starting water-surface elevations used in the hydraulic analyses were based on a normal depth analysis by computer and verified by hand calculations. In some cases, other studies yielded a se[t] of starting flood elevations for the selected recurrence intervals on streams in the study area. These elevations were verified by calculations except where the reflected significant backwater effects. Starting elevations were provided at the Fond du Lac corporate limits for the East Branch Fond du Lac River and West Branch Fond du Lac River by Owen-Ayres and Associates (Reference 7). Elevations at the upstream end of Silver Creek at the Ripon city limits were obtained from the USGS (Reference 12). Starting elevations for streams in the Milwaukee River system were obtained from a comprehensive basin plan by the SEWRPC (Reference 3). Water-surface elevations for the lake upstream of the dam at Campbellsport on the Milwaukee River were obtained from the Flood Insurance Study for Campbellsport by the Study Contractor (Reference 13). For Mosher and Supple Creeks, flood elevations at the North Fond du Lac village limits were obtained from the Flood Insurance Study for North Fond du Lac by the Study Contractor (Reference 14).

Flood profiles for streams draining into Lake Winnebago were developed with an analysis of both stream and lake flooding conditions. The simultaneous occurrence of both events has a very low probability - the product of the individual probabilities. Flood profile elevations for each recurrence interval on a stream were compared to the corresponding event on Lake Winnebago. The higher value controls and takes precedence on the flood profiles.

The division of flow for Taycheedah and Luco Creeks was analyzed by tiral flow profile determinations until the computed water-surface elevations at the confluence were in agreement.

Flood elevations are often raised by ice jams during spring thaws. However, the hydraulic analyses for this study are based only on the effects of unobstructed flow.

The delineation of 100-year approximate boundaries was based on existing mapping. A comprehensive watershed report by the SEWRPC covered areas studied in the Milwaukee River basin (Reference 3). A flood plain report prepared by the COE covered areas studied just outside the Fond du Lac city limits at De Neveu Creek (Reference 8). USGS Floodprone Area Maps covered the Lake Winnebago shoreline and areas in the Rock River basin (Reference 15). The Flood Hazard Boundary Map covered areas studied on the South Branch of the Manitowoc River near Johnsburg (Reference 16). In addition, the county Floodprone Area Map provided coverage of all

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unincorporated areas studied (Reference 17). In cases where several sources covered an area to be studied, the most detailed study and flood mapping were used.

For Sandy Beach Creek and Minawa Beach Creek, approximate flood boundaries were established by determining 100-year flood discharges and utilizing detailed aerial mapping and the HEC-2 backwater analysis (Reference 11).

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using topographic maps at a scale of 1:62500, with a contour interval of 20 feet (Reference 18) and more detailed flood maps from existing studies where applicable (References 3 and 8). The delineation of the 100-year approximate flood boundary was based on existing mapping (References 3, 8, 15, 16 and 17).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map. Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain

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development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the Wisconsin Department of Natural Resources has established a policy that limits encroachment in the flood plain to 0.1 foot (Reference 19).

The floodway proposed for this study is the "natural" floodway, the channel of the watercourse and those portions of the adjoining flood plain which are reasonably required to carry and discharge the floodwaters of the 100-year flood. The floodway reflects the outer limits of effective flow for a river or stream. The determination of the floodway for this study is based only on considerations of existing conditions of land use and structure characteristics.

Between river miles 1.00 and 2.00, Taycheedah Creek intersects and then coincides with the location of the Fond du Lac corporate limit. Therefore, part of the floodway in that vicinity is within the City of Fond du Lac. This area was not included for study in the City of Fond du Lac Flood Insurance Study (Reference 7). The delineation of a floodway for Long Lake and Lake Bernice is not appropriate and is not shown on the Flood Boundary and Floodway Map. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 4).

As shown on the Flood Boundary and Floodway Map, the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 14.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
MILWAUKEE RIVER								
A	80.73	358	715	4.10	947.1	947.1	947.1	0.0
B	81.16	270	1554	1.88	948.1	948.1	948.1	0.0
C	81.82	209	587	4.99	954.8	954.8	954.8	0.0
D	82.48	293	740	3.96	963.7	963.7	963.7	0.0
E	83.15	363	1623	2.20	970.4	970.4	970.4	0.0
F	84.27	303	1279	2.79	973.0	973.0	973.0	0.0
G	86.21	425	1873	1.90	978.8	978.8	978.8	0.0
H	87.25	254	977	3.65	985.0	985.0	985.0	0.0
I	88.45	200	1082	3.21	999.7	999.7	999.7	0.0
J	89.12	200	1398	2.49	1002.8	1002.8	1002.8	0.0
EAST BRANCH MILWAUKEE RIVER								
A	92.02	67	207	2.69	998.8	998.8	998.8	0.0
B	92.22	135	256	2.17	1005.3	1005.3	1005.3	0.0
WEST BRANCH MILWAUKEE RIVER								
A	80.07	256	1053	4.50	944.0	944.0	944.0	0.0
B	80.80	225	915	5.18	950.0	950.0	950.0	0.0
C	81.12	384	2896	1.64	953.0	953.0	953.0	0.0
D	83.11	341	1424	3.33	956.2	956.2	956.2	0.0
E	83.83	350	1696	2.79	959.1	959.1	959.1	0.0
F	85.22	366	1358	2.50	964.3	964.3	964.3	0.0
G	85.76	162	712	4.78	971.2	971.2	971.2	0.0
H	86.68	240	915	3.72	985.2	985.2	985.2	0.0
I	87.06	218	643	5.29	992.1	992.1	992.1	0.0

[1]MILES ABOVE MOUTH

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TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

MILWAUKEE RIVER -
EAST BRANCH MILWAUKEE RIVER - WEST BRANCH MILWAUKEE RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SILVER CREEK								
A	4.88[1]	133	403	5.43	810.2	810.2	810.2	0.0
B	4.93[1]	131	409	5.35	811.9	811.9	811.9	0.0
C	5.37[1]	373[4]	1635	1.34	826.0	826.0	826.0	0.0
D	8.72[1]	705	2422	0.53	928.8	928.8	928.8	0.0
E	9.36[1]	1115	2921	0.44	928.9	928.9	928.9	0.0
F	11.14[1]	400	835	2.16	934.0	934.0	934.0	0.0
G	11.23[1]	711	3067	0.59	937.1	937.1	937.1	0.0
H	11.36[1]	377	3484	0.52	937.3	937.3	937.3	0.0
I	12.36[1]	932	3780	0.48	940.2	940.2	940.2	0.0
PARSONS CREEK								
A	0.17[2]	200	486	3.81	819.8	819.8	819.8	0.0
B	0.84[2]	200	595	3.11	835.2	835.2	835.2	0.0
C	1.65[2]	200	547	3.38	850.7	850.7	850.7	0.0
D	2.00[2]	200	1025	1.80	861.9	861.9	861.9	0.0
CLAMSHELL CREEK								
A	0.25[1]	200	480	1.75	749.5	747.9[5]	747.9	0.0
B	0.42[1]	300	1900	0.44	749.5	749.5	749.5	0.0
C	0.85[1]	365	1307	0.59	751.4	751.4	751.4	0.0
D	1.76[1]	342	634	0.61	752.2	752.2	752.2	0.0
WEST FORK CLAMSHELL CREEK								
A	0.61[3]	108	202	1.91	761.3	761.3	761.3	0.0

[1]MILES ABOVE MOUTH
[2]MILES ABOVE CONFLUENCE WITH EAST BRANCH FOND DU LAC RIVER
[3]MILES ABOVE CONFLUENCE WITH CLAMSHELL CREEK
[4]THIS WIDTH EXTENDS WITHIN CITY OF RIPON
[5]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM LAKE WINNEBAGO

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TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

SILVER CREEK - PARSONS CREEK
CLAMSHELL CREEK - WEST FORK CLAMSHELL CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
POPLAR CREEK								
A	0.15	96	247	4.21	749.6	749.6	749.6	0.0
B	0.35	175	378	2.75	751.6	751.6	751.6	0.0
C	1.03	175	334	3.11	761.2	761.2	761.2	0.0
ANDERSON CREEK								
A	0.05	132	351	4.59	749.5	749.4[2]	749.4	0.0
B	0.19	205	1143	1.41	751.4	751.4	751.4	0.0
C	0.85	145	326	4.94	759.6	759.6	759.6	0.0
D	1.27	219	533	3.02	766.7	766.7	766.7	0.0
E	1.45	246	844	1.82	772.1	772.1	772.1	0.0
F	2.70	278	673	2.29	780.5	780.5	780.5	0.0
G	2.85	156	529	2.70	783.7	783.7	783.7	0.0
H	2.93	140	461	3.10	785.2	785.2	785.2	0.0
I	3.72	253	407	3.51	796.2	796.2	796.2	0.0
MOSHER CREEK								
A	0.20	148	526	2.00	751.7	751.7	751.7	0.0
B	2.00	322	481	1.79	774.4	774.4	774.4	0.0
C	2.24	31	160	5.38	778.1	778.1	778.1	0.0
D	2.29	148	602	1.20	779.2	779.2	779.2	0.0
SUPPLE CREEK								
A	1.16	176	680	0.94	752.7	752.7	752.7	0.0
B	1.26	203	631	1.01	752.8	752.8	752.8	0.0

[1]MILES ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM LAKE WINNEBAGO

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

POPLAR CREEK - ANDERSON CREEK - MOSHER CREEK - SUPPLE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
LUCO CREEK								
A	0.80	250	1287	2.05	750.7	750.7	750.7	0.0
TAYCHEEDAH CREEK								
A	0.72	1700[2]	N/A	N/A	751.1	751.1	751.1	0.0
B	1.10	866	1171	2.40	755.5	755.5	755.6	0.1
C	1.60	1300[3]	N/A	N/A	761.3	761.3	761.3	0.0
D	2.31	600	1330	2.00	770.8	770.8	770.9	0.1
E	3.03	220	644	4.00	786.3	786.3	786.4	0.1
F	3.79	205	1441	1.80	808.2	808.2	808.2	0.0
G	4.78	119	395	6.60	846.0	846.0	846.2	0.1
H	5.11	24	166	7.70	870.4	870.4	870.4	0.0
I	5.46	155	1188	1.10	899.7	899.7	899.7	0.0
J	5.64	104	490	2.60	902.0	902.0	902.0	0.0
K	5.73	86	193	6.60	909.9	909.9	909.9	0.0
L	5.94	104	826	1.50	925.1	925.1	925.2	0.1
M	6.51	187	923	0.90	947.7	947.7	947.7	0.0
N	7.72	61	157	5.60	978.8	978.8	978.9	0.1
O	7.84	71	198	1.50	980.6	980.6	980.7	0.1
P	8.35	140	336	0.90	985.8	985.8	985.8	0.0
Q	8.80	23	51	5.90	986.2	986.2	986.3	0.1
R	9.11	102	112	2.70	990.4	990.4	990.4	0.0

[1]MILES ABOVE MOUTH
[2]ADMINISTRATIVE FLOODWAY WIDTH
[3]THIS WIDTH EXTENDS WITHIN CITY OF FOND DU LAC

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TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

LUCO CREEK - TAYCHEEDAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
EAST BRANCH FOND DU LAC RIVER								
A	4.29	136	878	3.76	770.7	770.7	770.7	0.0
B	5.01	83	479	6.90	780.6	780.6	780.6	0.0
C	7.17	310	1184	2.79	800.0	800.0	800.0	0.0
D	7.57	307	875	3.77	805.2	805.2	805.2	0.0
E	7.71	93	603	4.70	808.7	808.7	808.7	0.0
F	8.01	90	704	4.70	810.4	810.4	810.4	0.0
G	8.70	300	947	3.48	815.9	815.9	815.9	0.0
H	8.83	260	1830	1.75	818.3	818.3	818.3	0.0
I	9.60	350	1731	1.85	819.5	819.5	819.5	0.0
J	10.28	400	2426	1.32	820.9	820.9	820.9	0.0
K	10.45	102	637	5.03	821.0	821.0	821.0	0.0
L	10.50	422	1500	2.13	821.8	821.8	821.8	0.0
M	10.97	370	1570	2.04	824.1	824.1	824.1	0.0
N	11.07	215	1292	2.48	824.9	824.9	824.9	0.0
O	11.18	348	1782	1.80	825.2	825.2	825.2	0.0
P	11.55	248	1654	1.93	826.6	826.6	826.6	0.0
Q	12.52	330	1877	1.70	828.1	828.1	828.1	0.0

[1]MILES ABOVE MOUTH

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

EAST BRANCH FOND DU LAC RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
WEST BRANCH FOND DU LAC RIVER								
A	3.06	320	971	2.06	760.3	760.3	760.3	0.0
B	3.38	157	407	4.92	765.7	765.7	765.7	0.0
C	3.78	114	537	3.73	768.9	768.9	768.9	0.0
D	4.22	349	673	2.97	771.5	771.5	771.5	0.0
E	4.90	257	485	4.13	776.0	776.0	776.0	0.0
F	4.99	343	831	2.41	778.7	778.7	778.7	0.0
G	5.18	343	862	2.32	779.8	779.8	779.8	0.0
H	5.27	434	952	2.10	780.8	780.8	780.8	0.0
I	5.95	183	423	4.73	790.8	790.8	790.8	0.0
J	6.00	151	355	6.15	791.9	791.9	791.9	0.0
K	6.93	431	1210	1.65	804.2	804.2	804.2	0.0
L	7.79	276	637	3.14	812.3	812.3	812.3	0.0
M	7.91	209	869	2.30	815.4	815.4	815.4	0.0
N	9.30	227	577	3.46	837.0	837.0	837.0	0.0
O	9.63	200	722	2.77	844.3	844.3	844.3	0.0
P	10.10	290	1340	1.49	845.7	845.7	845.7	0.0
Q	15.80	222	865	3.82	854.1	854.1	854.1	0.0
R	16.36	284	949	3.48	858.3	858.3	858.3	0.0
S	16.58	200	1455	2.27	864.0	864.0	864.0	0.0
T	16.89	172	1120	2.95	864.3	864.3	864.3	0.0
U	17.54	111	615	5.37	869.0	869.0	869.0	0.0

[1]MILES ABOVE MOUTH

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

WEST BRANCH FOND DU LAC RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
WEST BRANCH ROCK RIVER								
A	10.11[1]	263	1720	3.45	866.1	866.1	866.1	0.0
B	10.27[1]	464	2096	2.83	868.2	868.2	868.2	0.0
C	10.53[1]	285	1696	1.70	869.1	869.1	869.1	0.0
D	10.84[1]	262	1641	1.76	869.6	869.6	869.6	0.0
E	11.39[1]	269	1479	1.95	873.7	873.7	873.7	0.0
F	13.96[1]	518	1222	2.36	876.8	876.8	876.8	0.0
SOUTH BRANCH ROCK RIVER								
A	0.15[2]	527	3334	1.15	869.1	869.1	869.1	0.0
B	2.13[2]	394	1366	2.81	870.8	870.8	870.8	0.0
C	5.47[2]	392	1847	2.08	889.2	889.2	889.2	0.0
DE NEVEU CREEK								
A	2.43[1]	198	483	7.39	779.2	779.2	779.2	0.0
B	2.53[1]	354	694	7.89	782.2	782.2	782.2	0.0
C	2.72[1]	54	331	8.61	785.5	785.5	785.5	0.0
D	2.91[1]	444	657	8.05	789.9	789.9	789.9	0.0
E	4.51[1]	372	1640	3.74	811.0	811.0	811.0	0.0
F	4.66[1]	47	213	12.01	814.4	814.4	814.4	0.0
G	5.37[1]	184	424	8.20	827.9	827.9	827.9	0.0

[1]MILES ABOVE MOUTH
[2]MILES ABOVE CONFLUENCE WITH WEST BRANCH ROCK RIVER

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TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOODWAY DATA

WEST BRANCH ROCK RIVER – SOUTH BRANCH ROCK RIVER – DE NEVEU CREEK

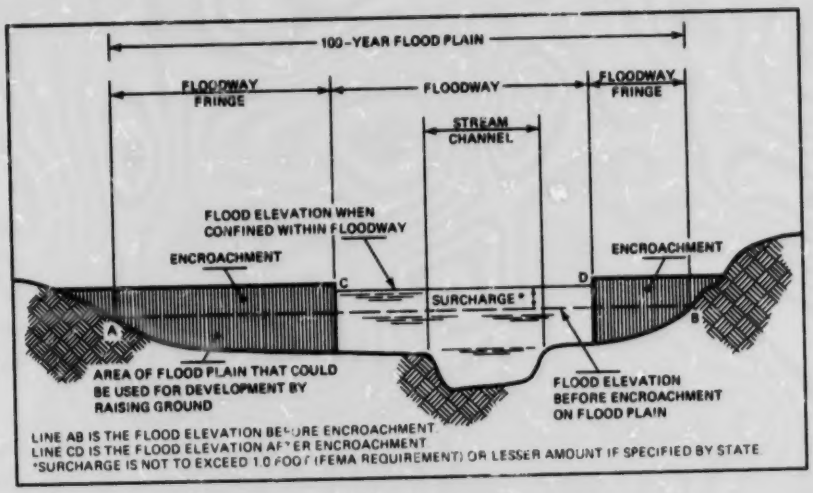
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 14 - Floodway Schematic

The floodways in this report are recommended to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source affecting the unincorporated areas of Fond du Lac County.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 per cent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the unincorporated areas of Fond du Lac County are shown on the Flood Profiles and are summarized in the Flood Insurance Zone Data Table (Table 5).

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5.2 Flood Hazard Factors

The FHF is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire unincorporated areas of Fond du Lac County were divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.
Zones A1-A7, A9, A10:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

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Table 5, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the unincorporated areas of Fond du Lac County is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by FEMA.

6.0 OTHER STUDIES

Published reports for the Milwaukee River watershed by the SEWRPC (Reference 3) and for the branches of the Fond du Lac River by the COE (Reference 8) provided 100-year flood profiles on flooding sources studied in detail for the unincorporated areas.

Several specific areas of disagreement with the SEWRPC profiles are noteworthy. The 100-year water-surface elevation above the dam at Long Lake on the East Branch Milwaukee River is 0.6 foot higher than the SEWRPC value. The reason for the difference is that the SEWRPC study allowed for use of the millrace to alleviate flood flows. The Water Regulation Bureau of the State of Wisconsin DNR indicated that no waste gates are provided and that flow through the abandoned power house should not be included in flood flow computations. Therefore, the analysis for this study is based on the assumption of spillway flow only.

In addition, there is significant disagreement at double arch culvert bridges on the Milwaukee River at Ashford-Auburn Road and on the West Branch Milwaukee River at Main Street. The SEWRPC profiles exhibit no significant backwater effect at these bridges. However, the analysis for this study resulted in a backwater effect of 4.0 feet and 3.0 feet, respectively, at the same 100-year flood discharge as the SEWRPC analysis. The number of reconstructed bridges since the SEWRPC analysis and the more intensive use of intermediate cross sections for this study precludes a meaningful discussion of other specific areas of disagreement. However, the 100-year flood profiles for this study are within 0.5 to 1.0 foot of the SEWRPC profiles with the exception of the backwater effects discussed above.

On the West Branch Fond du Lac River, the 100-year water-surface elevation at the U.S. Highway 41 bridge is 0.5 foot lower than the corresponding COE elevation. In addition, the 100-year flood elevations at the County Highway T bridges at mile 4.33 and at mile 5.25 are 1.5 feet lower and 1.0 foot higher respectively than the corresponding COE profile elevations. These differences are the result of new U.S. Highway 41 bridges and recent channel modifications in the area.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
MILWAUKEE RIVER							
REACH 1	0185,0195	–2.1	–0.8	1.4	020	A4	VARIES–SEE MAP
REACH 2	0185	–0.9	–0.3	0.5	010	A2	VARIES–SEE MAP
REACH 3	0185	–2.4	–0.8	1.4	025	A5	VARIES–SEE MAP
EAST BRANCH MILWAUKEE RIVER							
REACH 1	0170	–1.7	–0.8	1.3	015	A3	VARIES–SEE MAP
REACH 2	0160,0170	–2.8	–0.9	2.0	030	A6	VARIES–SEE MAP
WEST BRANCH MILWAUKEE RIVER							
REACH 1	0195	–2.0	–0.7	1.5	020	A4	VARIES–SEE MAP
REACH 2	0180,0190,0195	–2.4	–0.9	1.5	025	A5	VARIES–SEE MAP
SILVER CREEK							
REACH 1	0030	–2.1	–0.6	0.8	020	A4	VARIES–SEE MAP
REACH 2	0030	–4.8	–1.2	0.8	050	A10	VARIES–SEE MAP
REACH 3[4]	0030	–3.2	–0.7	0.9	030	A6	VARIES–SEE MAP
REACH 4	0030	–1.3	–0.4	0.9	015	A3	VARIES–SEE MAP
REACH 5	0030,0040	–2.5	–0.5	0.6	025	A5	VARIES–SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT
[4]DATA FOR THIS REACH TAKEN FROM CITY OF RIPON, WISCONSIN FIS

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TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

MILWAUKEE RIVER - EAST BRANCH MILWAUKEE RIVER - WEST BRANCH MILWAUKEE RIVER - SILVER CREEK

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
PARSONS CREEK							
REACH 1	0135	–1.9	–0.6	1.0	020	A4	VARIES–SEE MAP
CLAMSHELL CREEK							
REACH 1	0060	–0.8	–0.3	1.0	010	A2	VARIES–SEE MAP
WEST FORK CLAMSHELL CREEK							
REACH 1	0060	–1.1	–0.4	0.8	010	A2	VARIES–SEE MAP
POPLAR CREEK							
REACH 1	0060	–1.3	–0.4	1.2	015	A3	VARIES–SEE MAP
ANDERSON CREEK							
REACH 1	0060,0070	–2.2	–0.9	1.8	020	A4	VARIES–SEE MAP
REACH 2	0060,0070	–1.5	–0.4	1.1	015	A3	VARIES–SEE MAP
REACH 3	0060,0070	–2.8	–1.1	2.5	030	A6	VARIES–SEE MAP
REACH 4	0070	–1.3	–0.6	1.5	015	A3	VARIES–SEE MAP
REACH 5	0070	–2.1	–0.8	1.0	020	A4	VARIES–SEE MAP
REACH 6	0070	–1.0	–0.5	0.8	010	A2	VARIES–SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

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TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

PARSONS CREEK - CLAMSHELL CREEK - WEST FORK CLAMSHELL CREEK - POPLAR CREEK - ANDERSON CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
MOSHER CREEK							
REACH 1	0070	–2.5	–0.9	0.8	025	A5	VARIES–SEE MAP
REACH 2	0070	–2.2	–0.6	1.2	020	A4	VARIES–SEE MAP
REACH 3	0070	–1.5	–0.4	1.5	015	A3	VARIES–SEE MAP
SUPPLE CREEK							
REACH 1	0070	–3.1	–0.6	0.7	030	A6	VARIES–SEE MAP
LUCO CREEK							
REACH 1	0070	–0.8	–0.1	0.4	010	A2	VARIES–SEE MAP
TAYCHEEDAH CREEK							
REACH 1	0070,0090, 0155	–1.4	–0.2	1.0	015	A3	VARIES–SEE MAP
EAST BRANCH FOND DU LAC RIVER							
REACH 1	0135	–2.6	–0.8	1.7	025	A5	VARIES–SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

MOSHER CREEK - SUPPLE CREEK - LUCO CREEK - TAYCHEEDAH CREEK - EAST BRANCH FOND DU LAC RIVER

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
WEST BRANCH FOND DU LAC RIVER							
REACH 1	0070	−1.0	−0.4	1.0	010	A2	VARIES–SEE MAP
REACH 2	0070,0135	−1.4	−0.5	0.9	015	A3	VARIES–SEE MAP
REACH 3	0065,0070,0135	−1.2	−0.5	0.7	010	A2	VARIES–SEE MAP
REACH 4	0065	−1.9	−0.6	1.6	020	A4	VARIES–SEE MAP
REACH 5	0065	−3.0	−1.3	3.7	030	A6	VARIES–SEE MAP
WEST BRANCH ROCK RIVER							
REACH 1	0120	−3.5	−1.1	2.6	035	A7	VARIES–SEE MAP
REACH 2	0120	−4.4	−0.8	2.0	045	A9	VARIES–SEE MAP
REACH 3	0120	−2.2	−0.8	2.0	020	A4	VARIES–SEE MAP

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT

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TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

WEST BRANCH FOND DU LAC RIVER - WEST BRANCH ROCK RIVER

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
SOUTH BRANCH ROCK RIVER							
REACH 1	0120	−3.4	−1.2	2.7	035	A7	VARIES–SEE MAP
REACH 2	0120	−2.8	−0.8	1.2	030	A6	VARIES–SEE MAP
LAKE WINNEBAGO							
REACH 1	0015,0060, 0070,0080, 0090	−0.7	−0.3	0.7	005	A1	750
DE NEVEU CREEK							
REACH 1	0070	−2.5	−1.0	N/A	025	A5	VARIES-SEE MAP
REACH 2	0070,0135,0155	−1.5	−0.8	N/A	015	A3	VARIES-SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

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TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

SOUTH BRANCH ROCK RIVER – LAKE WINNEBAGO – DE NEVEU CREEK

At the U.S. Highway 41 bridge on East Branch Fond du Lac River, the 100-year water-surface elevation is 1.0 foot lower than the corresponding COE profile elevation. The construction of new bridges at U.S. Highway 41 since the COE study account for this disagreement. In addition, backwater effects at the Hickory Road and County Highway D bridges result in 100-year water-surface elevations 2.0 feet and 2.5 feet higher, respectively, than the corresponding COE elevations. Differences result because modeling techniques used for this study account for limits of effective flow relating to apparent overbank storage characteristics and flow expansions and contractions at bridges.

Flood Insurance Studies have been completed for the City of Fond du Lac, and the Village of Campbellsport and are in progress for Dodge County, Winnebago County, Green Lake County, Sheboygan County, the City of North Fond du Lac, and the City of Ripon (References 7, 13, 20, 21, 22, 23, 14, and 12). This Flood Insurance Study is in agreement with the above-mentioned studies except in the City of Fond du Lac where Taycheedah Creek and the upstream portion of West Branch Fond du Lac River were not included in the scope of study.

A Flood Hazard Boundary Map has been published for Fond du Lac County (Reference 16). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 300 South Wacker Drive, Chicago, Illinois 60606.

8.0 ADDENDUM (Revised: March 18, 1986)

8.1 Purpose

The purpose of this Flood Insurance Study Addendum is to incorporate new and revised data into this currently effective Flood Insurance Study for the Unincorporated Areas of Fond du Lac County, Wisconsin. This Addendum is intended to provide updated information that aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

8.2 Acknowledgments

The hydrologic and hydraulic analyses for this Addendum were performed by Donohue and Associates, Inc., for De Neveu Creek, and by a Technical Evaluation Contractor for the Federal Emergency Management Agency (FEMA) on Taycheedah and Luco Creeks. FEMA reviewed and accepted these data for purposes of this revision.

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8.3 Scope

This Addendum incorporates the results of the hydrologic and hydraulic reanalyses performed for Taycheedah and Luco Creeks into the currently effective Flood Insurance Study. The base flood elevations and zone designations for Taycheedah Creek, from its mouth at Lake Winnebago upstream to river mile 9.55, were modified to reflect a reduction in peak discharge values and revisions made to the hydraulic analysis. The peak discharge values of the selected frequency flood events on Luco Creek were included as part of the reanalysis of Taycheedah Creek.

A detailed flood analysis of De Neveu Creek from the City of Fond du Lac corporate limits to river mile 5.37 has also been incorporated into this Addendum.

The detailed flood boundaries along Luco Creek, De Neveu Creek, and Taycheedah Creek (from the mouth to approximately river mile 3.0) and the approximate 100-year flood boundary along McDermott Creek, a tributary to De Neveu Creek, and a tributary to Taycheedah Creek were redelineated using updated topographic mapping with a 2-foot contour interval (Reference 24).

For all remaining flooding sources studied by detailed or approximate methods, the flood boundaries were redelineated and added using topographic mapping at a scale of 1:24000 and a contour interval of 10 feet (Reference 25).

Additional minor changes have been incorporated into this Addendum. As a result of stream rechannelization, a portion of East Branch Fond du Lac River, the upstream limit of detailed study (located formerly at river mile 14.67), has been moved downstream to river mile 12.52. Minor adjustments were made to the flood profiles for Mosher Creek, West Branch Rock River, and Silver Creek, to ensure agreement between the profiles and the corresponding Floodway Data tables. Minor labeling changes were made to the profiles of West Branch Fond du Lac River, South Branch Rock River, Silver Creek and the Milwaukee River. The flood profiles for Parsons Creek and West Fork Clamshell Creek were modified slightly to match their confluence elevations with East Branch Fond du Lac River and Clamshell Creek, respectively. The profiles for West Branch Milwaukee River and West Branch Fond du Lac River were extended through areas outside the county's jurisdiction.

8.4 Hydrologic and Hydraulic Analyses

The hydrologic analysis of De Neveu Creek was performed in conjunction with a Flood Control Feasibility Study (Reference 26) prepared for the City of Fond du Lac. For that report, the selected recurrence interval discharge values (10-, 25-, 50-, and 100-year) were developed through the use of the U.S. Army Corps of Engineers HEC-1 computer model (Reference 27) with a rainfall-runoff option designed to generate a dimensionless unit hydrograph that was then adjusted through the application of various hydrologic parameters. No hydraulic data were generated for the 500-year flood event.

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The hydrologic reanalysis of Taycheedah Creek was based on the development of multiple regression equations by the U.S. Geological Survey methods outlined in "Estimating Magnitude and Frequency of Floods in Wisconsin" (Reference 5).

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 6.

TABLE 6 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TAYCHEEDAH CREEK (including Luco Creek)					
at Lake Winnebago	17.1	1,100	2,400	2,800	5,000
at downstream crossing of County Highway T	6.6	650	1,100	1,275	1,800
at County Highway UU	4.3	450	750	850	1,300
at upstream crossing of County Highway T	3.1	160	255	300	415
DE NEVEU CREEK					
at mouth	21.0	1,640	2,530	3,140	N/A
upstream of confluence with McDermott Creek	19.0	1,480	2,270	2,850	N/A
at County Highway V	16.3	1,340	2,040	2,580	N/A

The HEC-2 (Reference 11) hydraulic analysis for De Neveu Creek was based in part on the model previously developed for the Flood Insurance Study for the City of Fond du Lac (Reference 7). The additional cross sections required for the county analysis were field surveyed or obtained from recent topographic mapping (Reference 24). The starting water-surface elevations were taken as the normal elevations on Lake Winnebago.

The HEC-2 hydraulic reanalyses of Luco and Taycheedah Creeks were based in part on the information presented in the currently effective Flood Insurance Study for Fond du Lac County (to which this Addendum applies). Minor adjustments to cross-section information and hydraulic parameters were made for the reanalysis, which was based on the reduced peak discharge values. As a result of new topographic information, some areas along Tycheedah Creek were designated as an AH zone.

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The water-surface elevations for De Neveu, Luco, and Taycheedah Creeks were developed through the use of the HEC-2 computer model. The revised flood profiles show the computed water-surface elevations for flood events of the selected recurrence intervals.

The roughness coefficients (Manning's "n") for the above-mentioned creeks were assigned based on field inspection and engineering judgment. For De Neveu Creek, the "n" values for the overbank areas ranged from 0.035 - 0.120, and for the channel, from 0.035 - 0.045. For the overbank areas of Luco and Taycheedah Creeks, the values ranged from 0.045 - 0.100, and those assigned to the channels ranged from 0.025 - 0.030.

8.5 Floodways

No floodway had been previously determined for De Neveu Creek as a result of the approximate nature of the study done on the creek in the current Flood Insurance Study. This Addendum incorporates the results of the floodway analysis for De Neveu Creek.

Floodway computations for Luco and Taycheedah Creeks were revised as a result of the hydrologic reanalyses. As a consequence of the flood plain redelineation based on more detailed topographic mapping (References 24 and 25), all floodway delineations shown throughout the county may be slightly different than those presented in the effective study. All floodways were computed on the basis of equal conveyance reduction from each side of the flood plain. Also, it is noted that the floodway along Luco and Taycheedah Creeks has been modified to reflect an administrative floodway agreed upon by the city and the State of Wisconsin. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was revised and are presented in Table 4, Floodway Data.

8.6 Other Studies

The Flood Insurance Study for the City of Fond du Lac is currently being revised (Reference 7). The results of that study and the results published herein are in agreement.

Flood Insurance Studies have also been published for the following contiguous communities: the Cities of Ripon and Waupun (References 12 and 28), the Villages of Campbellsport and North Fond du Lac (References 13 and 14), and the Unincorporated Areas of Dodge, Winnebago, Green Lake, Sheboygan, Washington, and Calumet Counties (References 20, 21, 22, 23, 29, and 30). The results published in this Addendum may not agree exactly with the results published in the above-mentioned Flood Insurance Studies, as a result of the use of updated topographic, hydrologic, and hydraulic information for this report.

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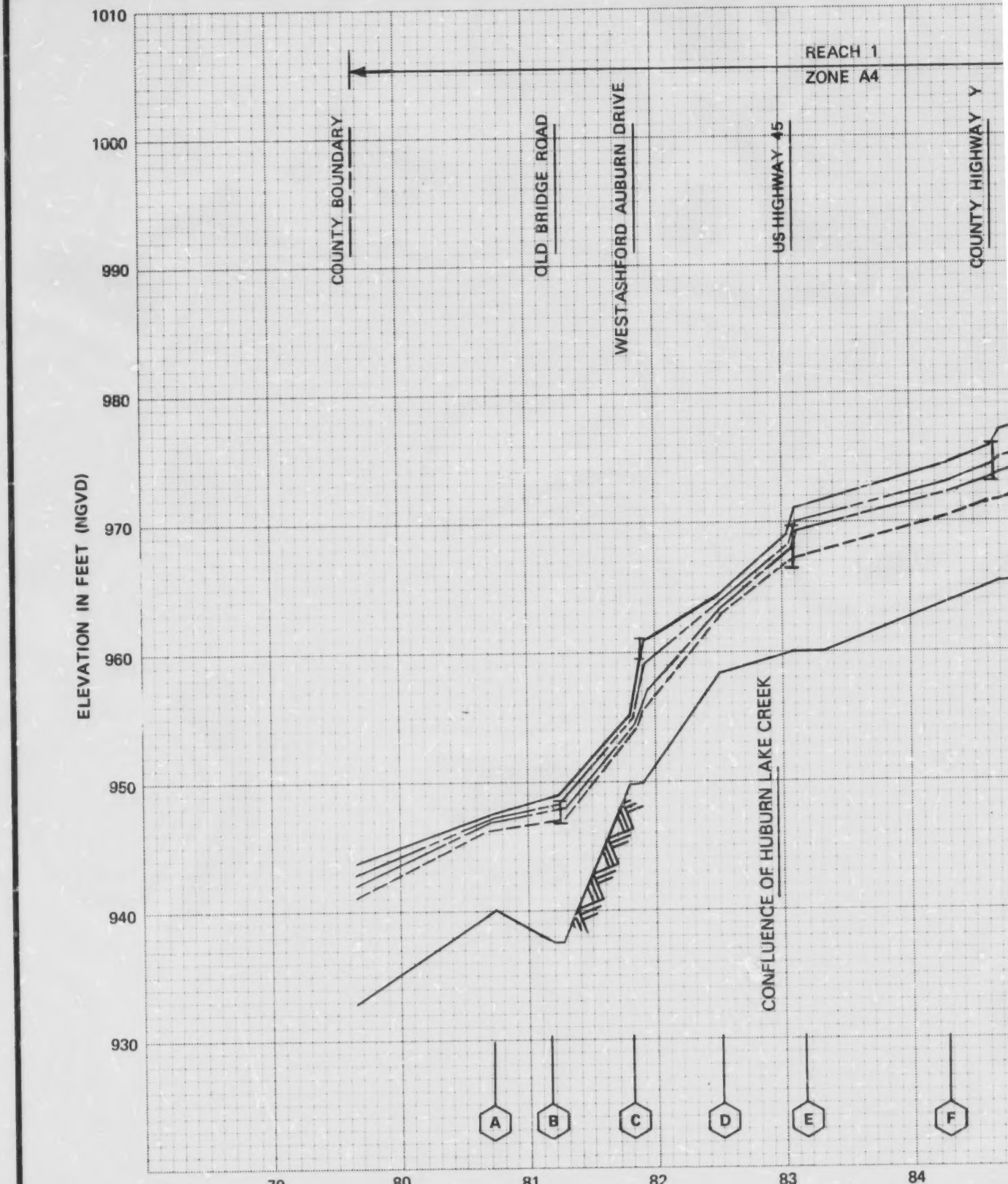
REACH 1
ZONE A4
COUNTY BOUNDARY
OLD BRIDGE ROAD
WESTASHFORD AUBURN DRIVE
US HIGHWAY 45
COUNTY HIGHWAY Y
CONFLUENCE OF HUBURN LAKE CREEK
ELEVATION IN FEET (NGVD)
1010
1000
990
980
970
960
950
940
930
79
80
81
82
83
84
A
B
C
D
E
F
STREAM DISTANCE IN MIL

REACH 2
ZONE A2

REACH 3

COUNTY HIGHWAY Y

VILLAGE OF CAMPBELLSPORT
CORPORATE LIMITS

PRIVATE DRIVE

LIMIT OF DETAILED STUDY

VILLAGE OF CAMPBELLSPORT
CORPORATE LIMITS

G

H

I

J

LEGEND

500–YEAR FLOOD

100–YEAR FLOOD

50–YEAR FLOOD

10–YEAR FLOOD

STREAM BED

A

CROSS SECTION LOCATION

85 86 87 88 89 90

ABOVE MOUTH

FLOOD PROFILES

MILWAUKEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

01P

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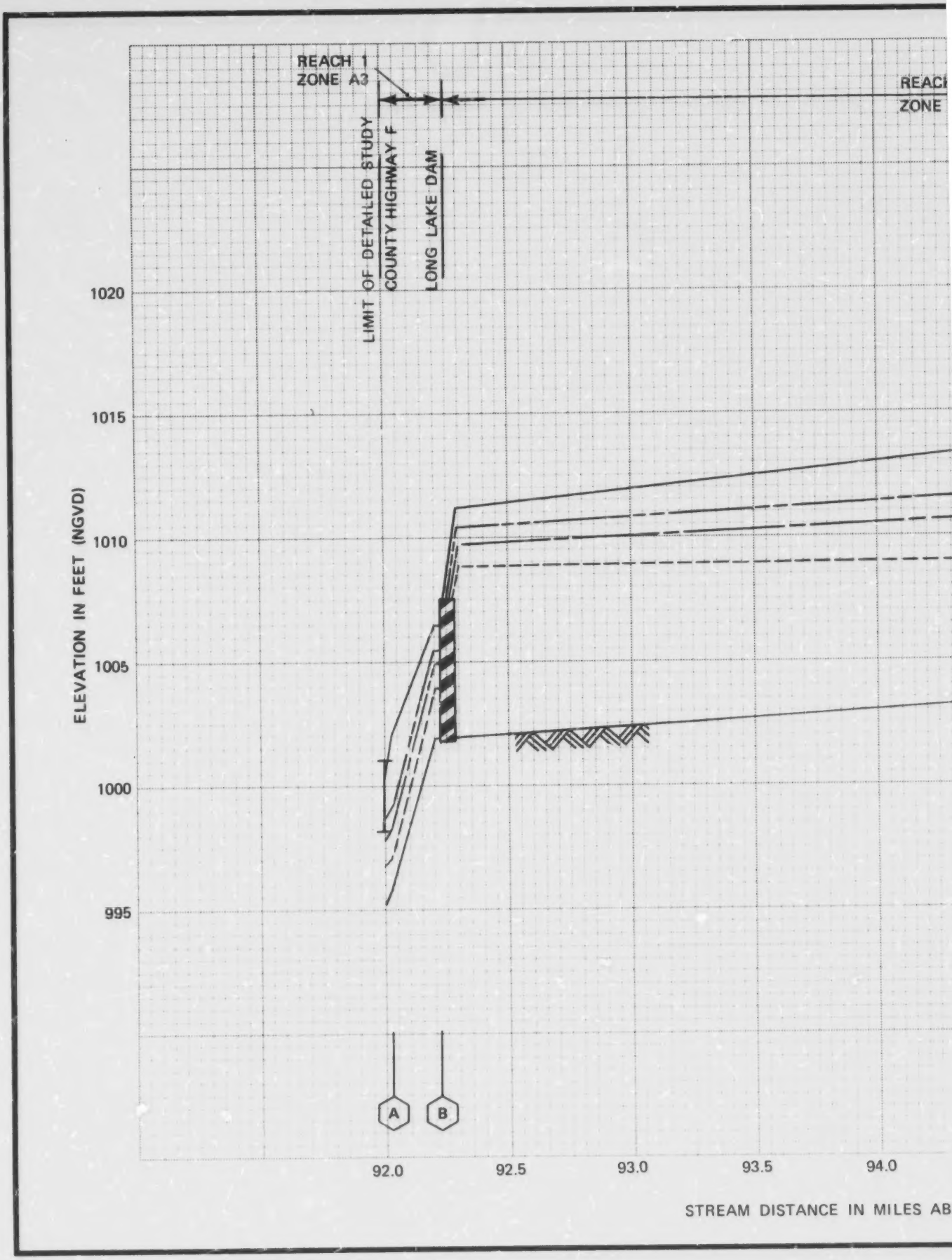
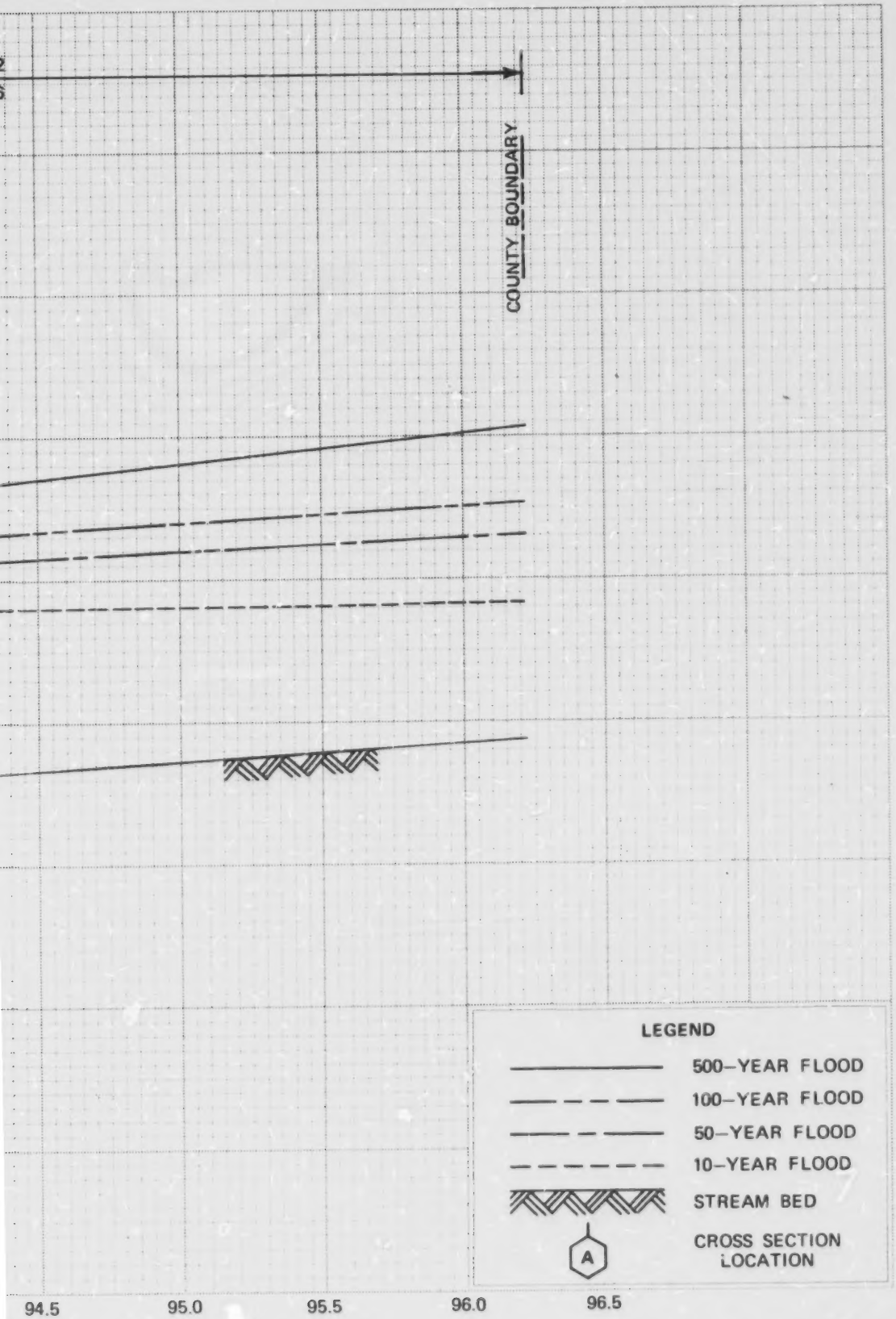

REACH 1
ZONE A3
REACH
ZONE
LIMIT OF DETAILED STUDY
COUNTY HIGHWAY F
LONG LAKE DAM
1020
1015
1010
1005
1000
995
ELEVATION IN FEET (NGVD)
A
B
92.0
92.5
93.0
93.5
94.0
STREAM DISTANCE IN MILES AB



E MOUTH

FLOOD PROFILES

EAST BRANCH MILWAUKEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

02P

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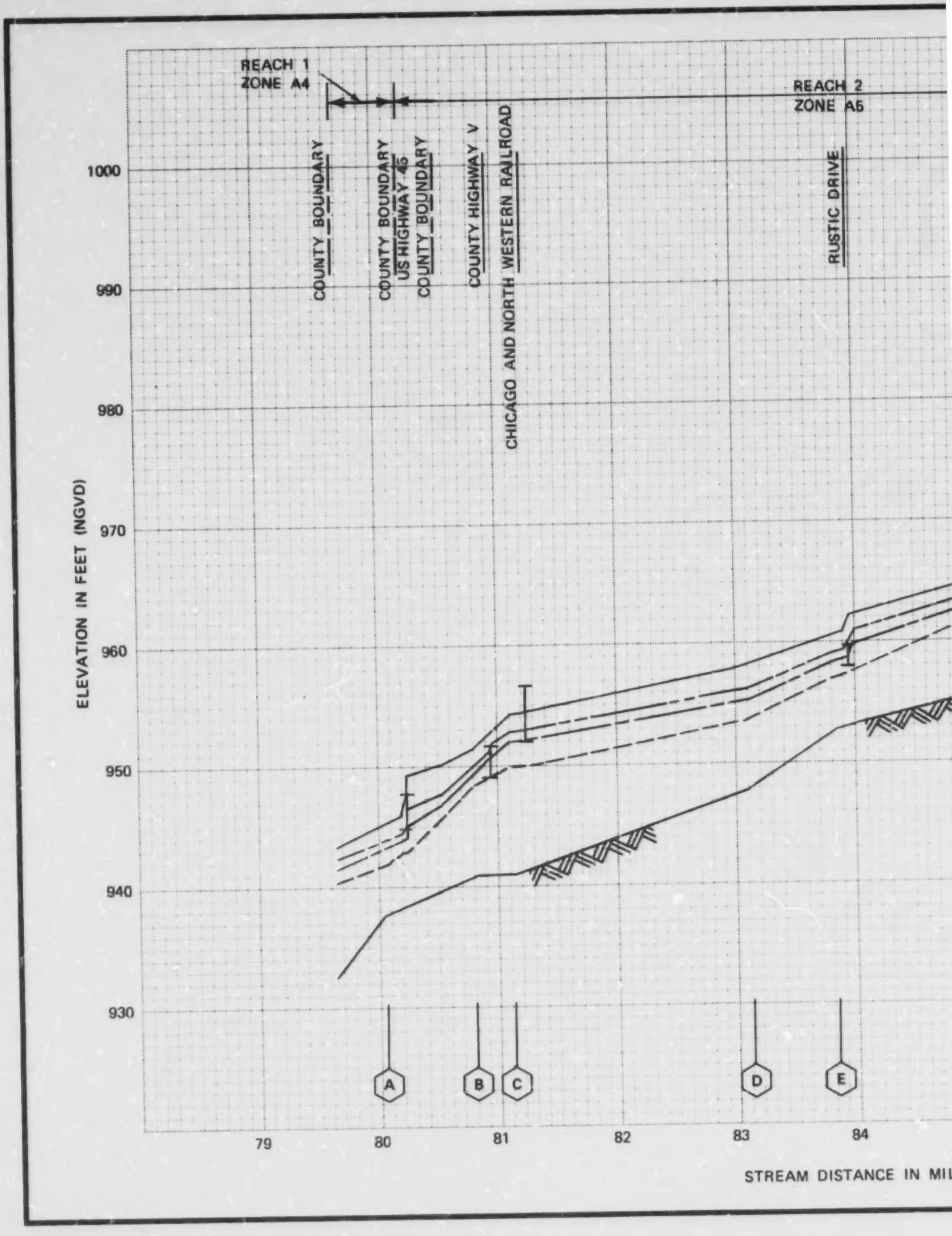
REACH 1
ZONE A4
REACH 2
ZONE A5
COUNTY BOUNDARY
COUNTY BOUNDARY
US HIGHWAY 45
COUNTY BOUNDARY
COUNTY HIGHWAY V
CHICAGO AND NORTH WESTERN RAILROAD
RUSTIC DRIVE
ELEVATION IN FEET (NGVD)
1000
990
980
970
960
950
940
930
A
B
C
D
E
79
80
81
82
83
84
STREAM DISTANCE IN MI

FLOOD PROFILES

WEST BRANCH MILWAUKEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

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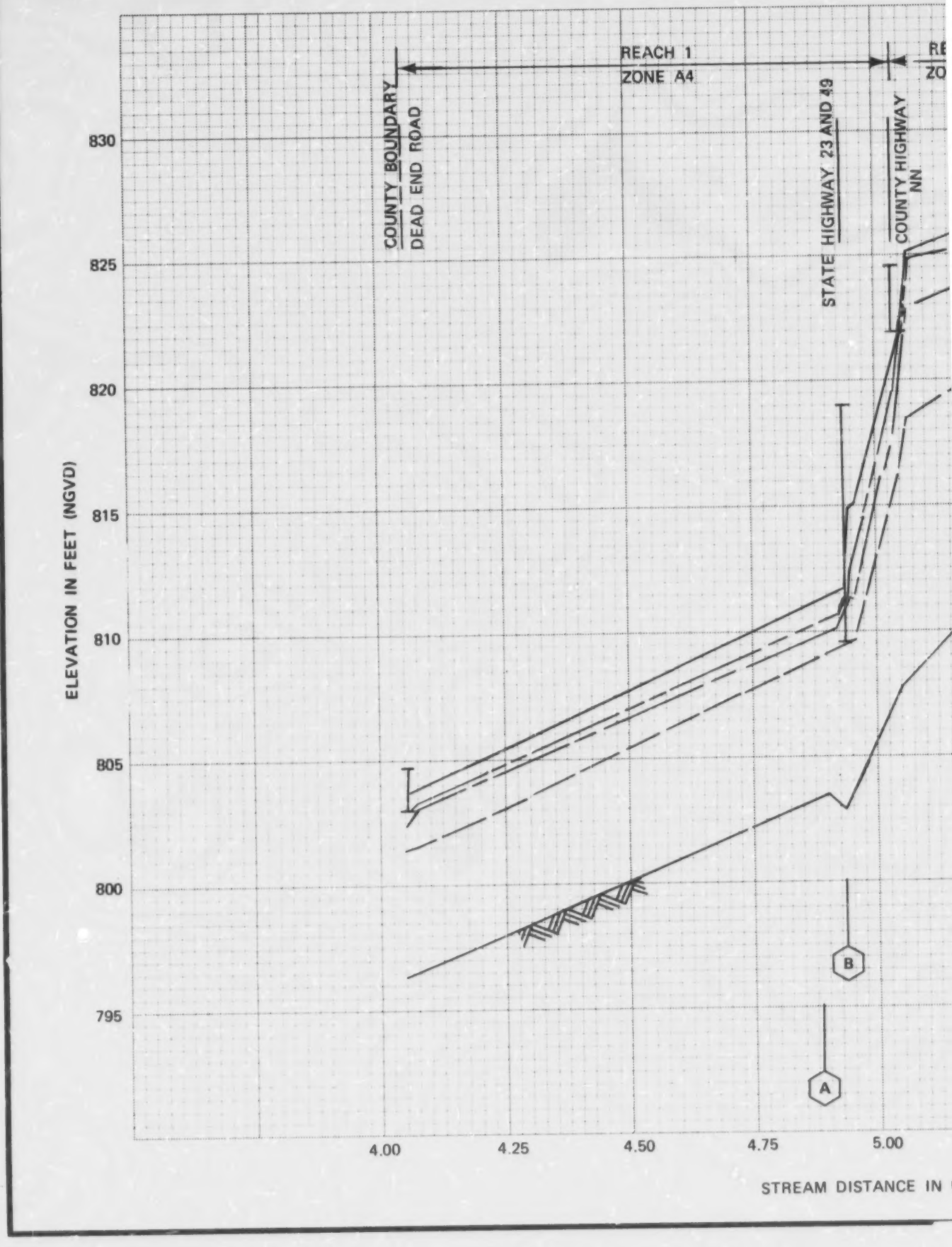
REACH 1
ZONE A4
COUNTY BOUNDARY
DEAD END ROAD
STATE HIGHWAY 23 AND 49
COUNTY HIGHWAY
NN
ELEVATION IN FEET (NGVD)
830
825
820
815
810
805
800
795
4.00
4.25
4.50
4.75
5.00
B
A
STREAM DISTANCE IN

FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

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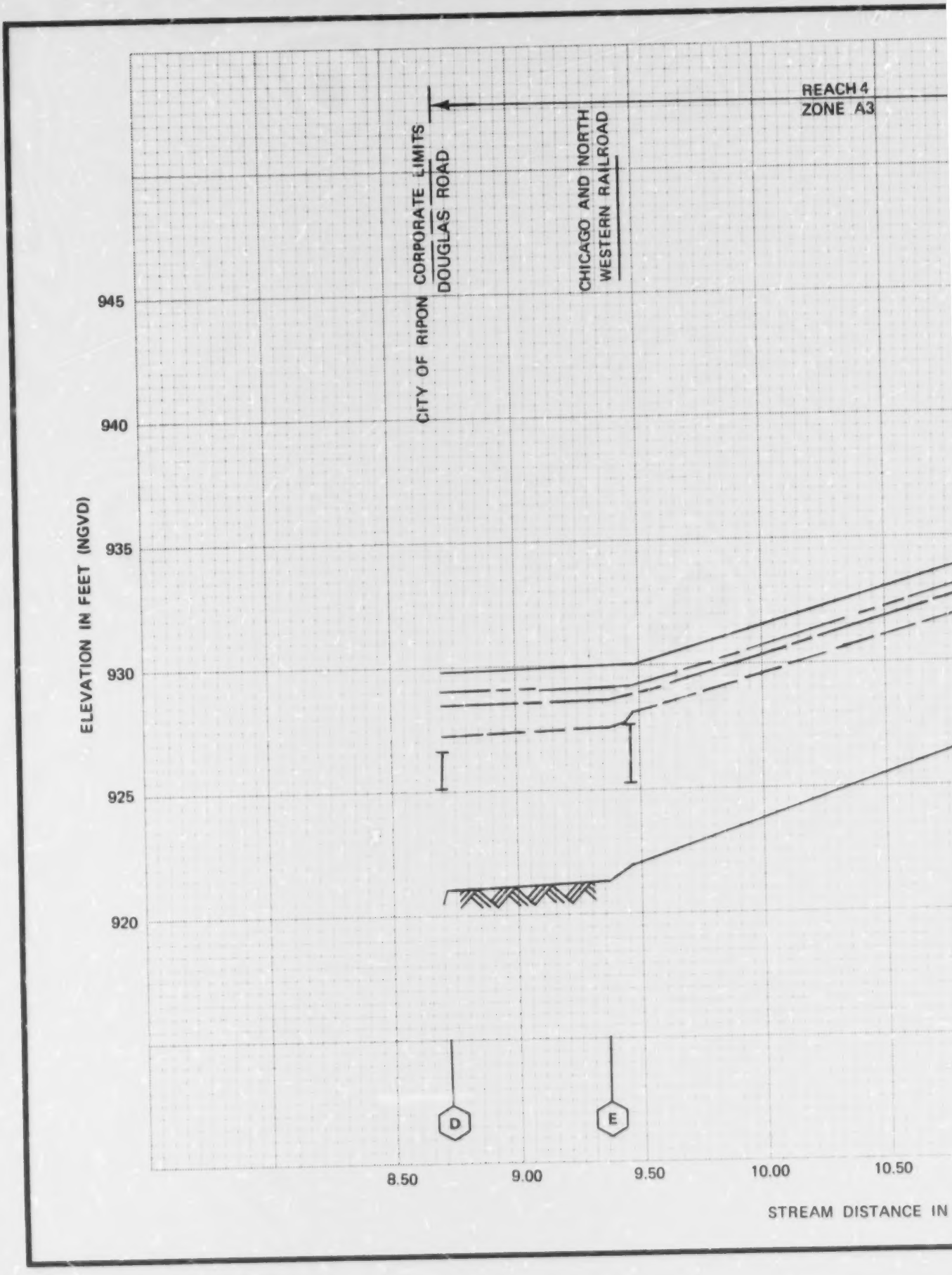
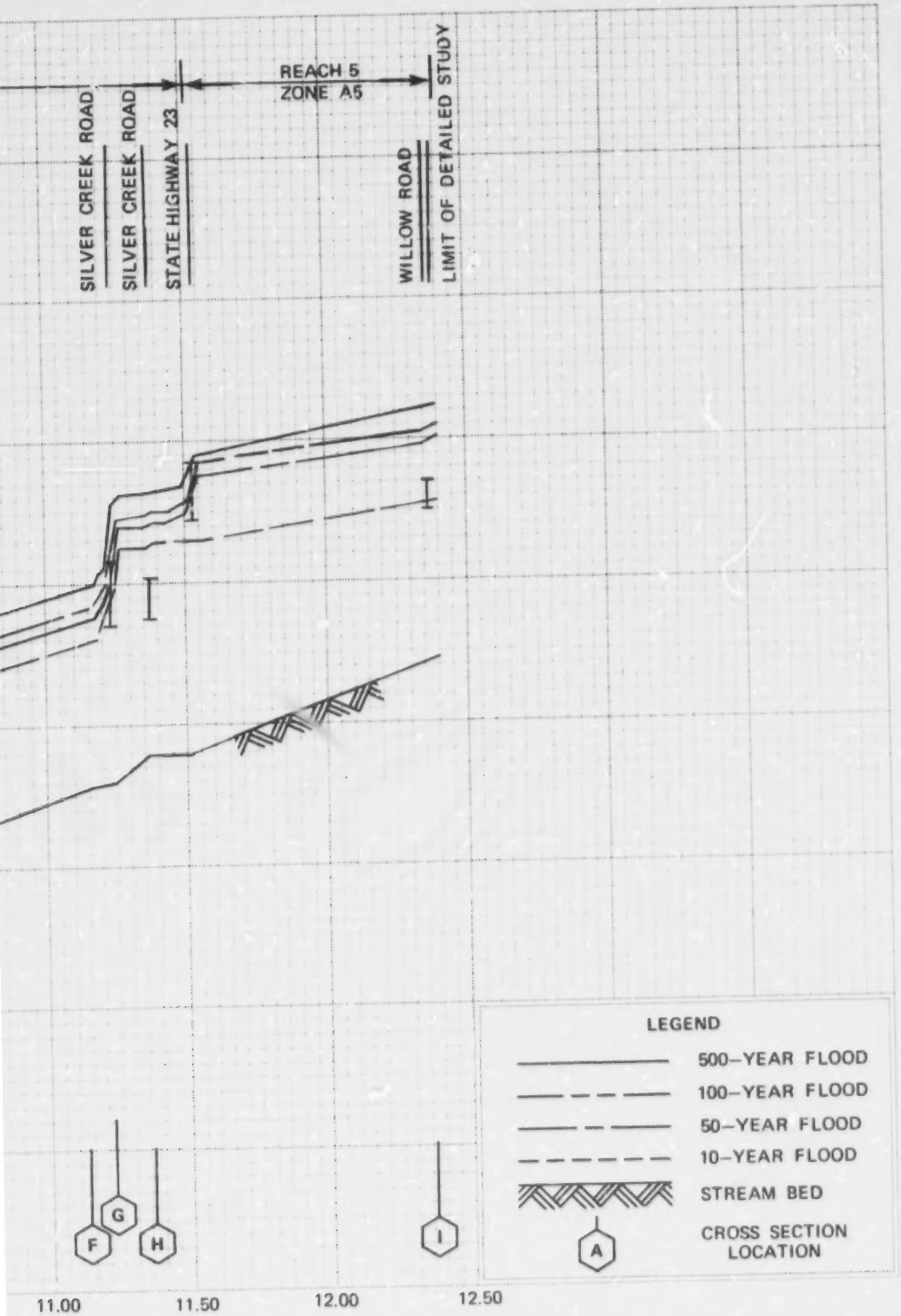

REACH 4
ZONE A3
CITY OF RIPON CORPORATE LIMITS
DOUGLAS ROAD
CHICAGO AND NORTH WESTERN RAILROAD
945
940
935
930
925
920
ELEVATION IN FEET (NGVD)
D
E
8.50
9.00
9.50
10.00
10.50
STREAM DISTANCE IN



FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

05P

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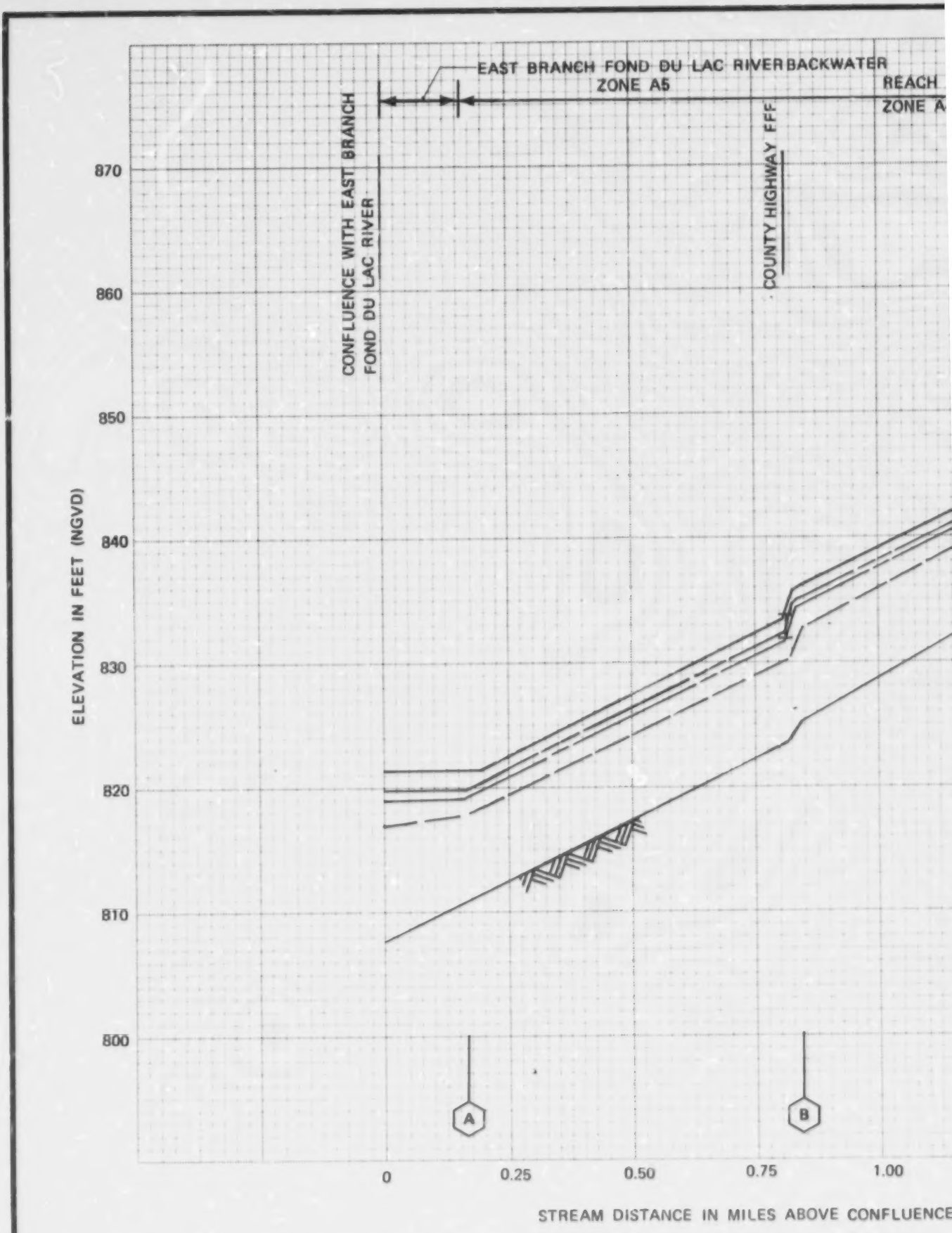
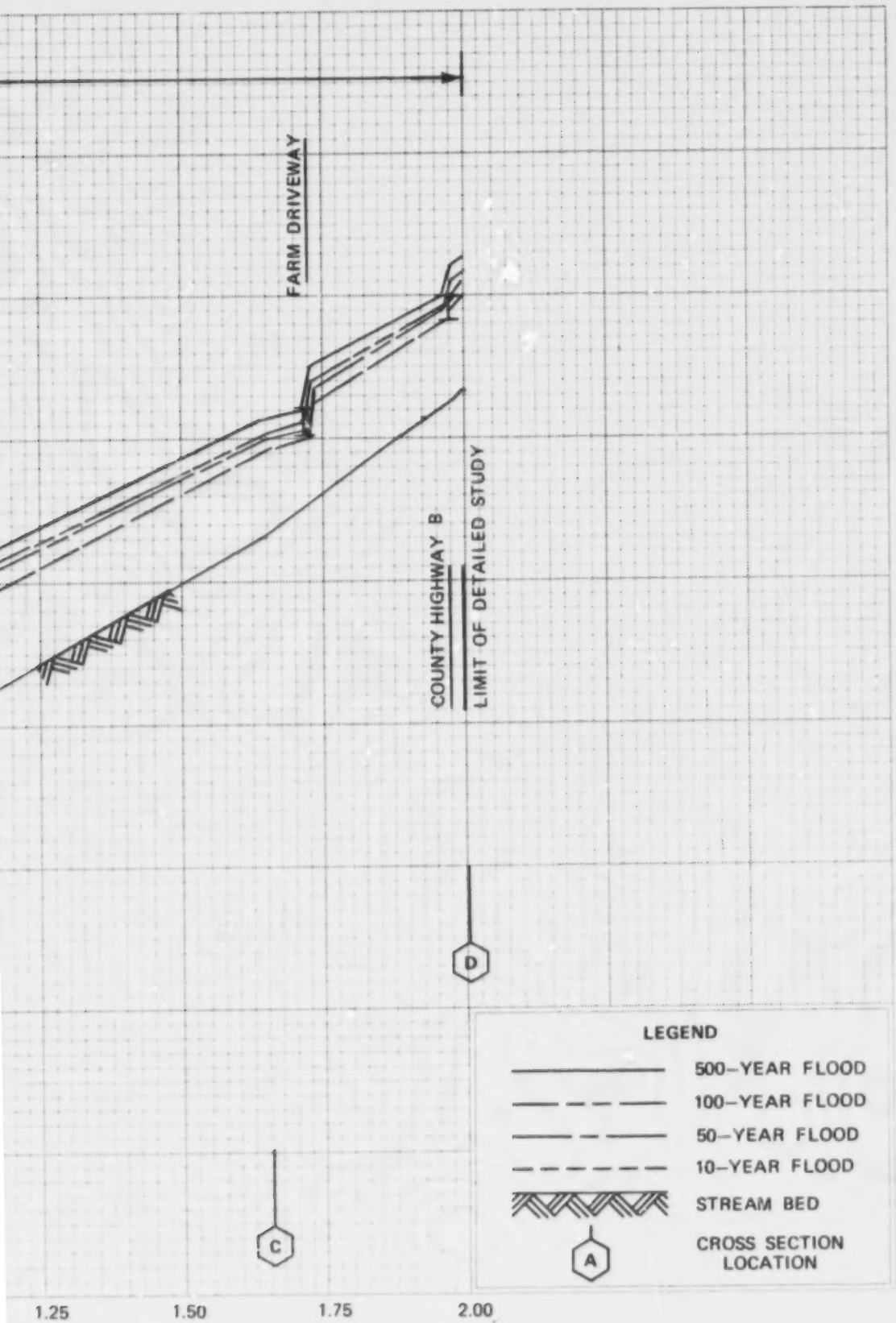

EAST BRANCH FOND DU LAC RIVER BACKWATER
ZONE A5
REACH
ZONE A
CONFLUENCE WITH EAST BRANCH FOND DU LAC RIVER
COUNTY HIGHWAY FFF
870
860
850
840
830
820
810
800
ELEVATION IN FEET (NGVD)
A
B
0
0.25
0.50
0.75
1.00
STREAM DISTANCE IN MILES ABOVE CONFLUENCE



ITH EAST BRANCH FOND DU LAC RIVER

FLOOD PROFILES

PARSONS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

06P

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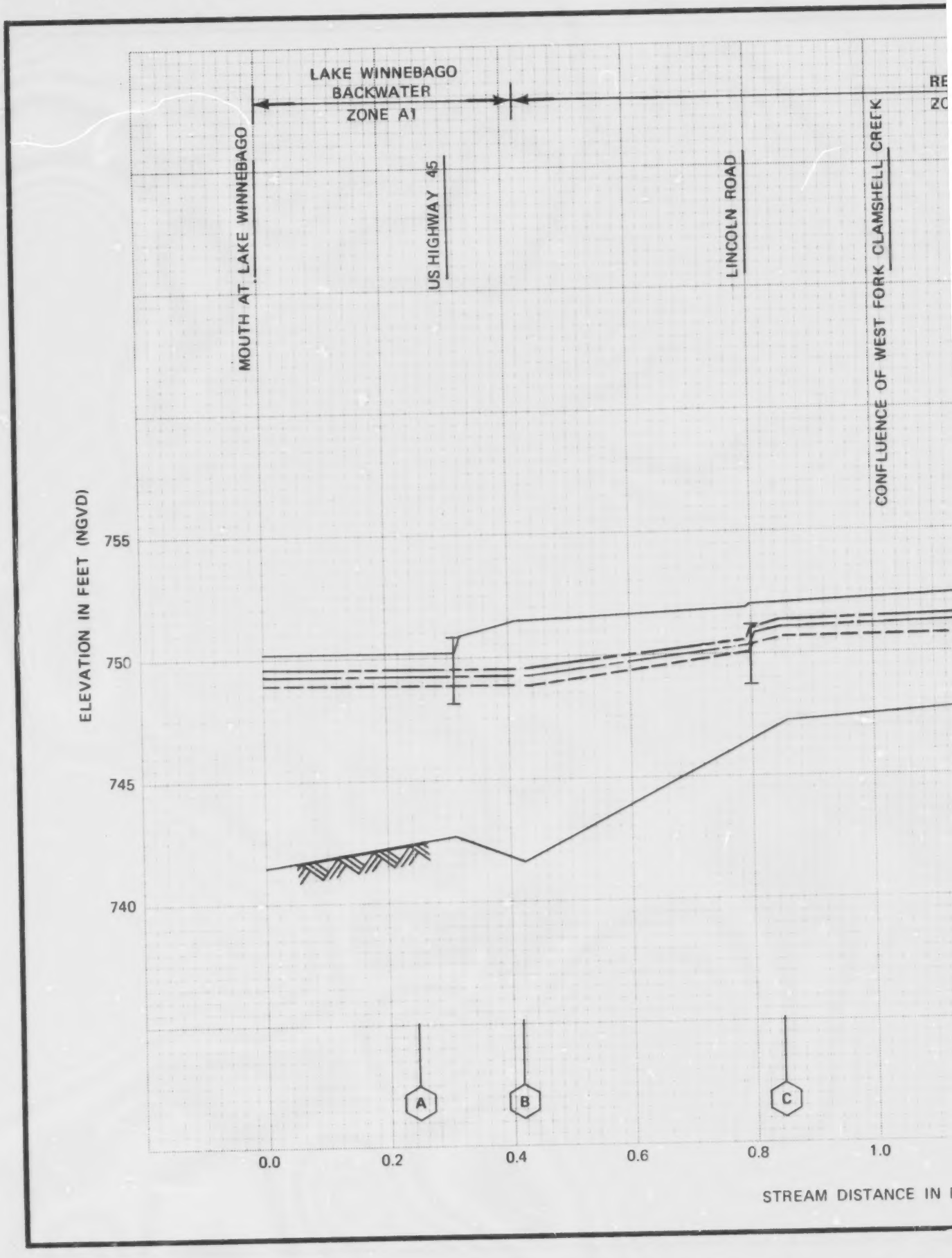
LAKE WINNEBAGO
BACKWATER
ZONE A1
MOUTH AT LAKE WINNEBAGO
US HIGHWAY 45
LINCOLN ROAD
CONFLUENCE OF WEST FORK CLAMSHELL CREEK
ELEVATION IN FEET (NGVD)
755
750
745
740
A
B
C
0.0
0.2
0.4
0.6
0.8
1.0
STREAM DISTANCE IN

CH 1
E A2

LIMIT OF DETAILED STUDY

LEGEND

500–YEAR FLOOD
100–YEAR FLOOD
50–YEAR FLOOD
10–YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION

D

A

1.2 1.4 1.6 1.8

LES ABOVE MOUTH

FLOOD PROFILES

CLAMSHELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

07P

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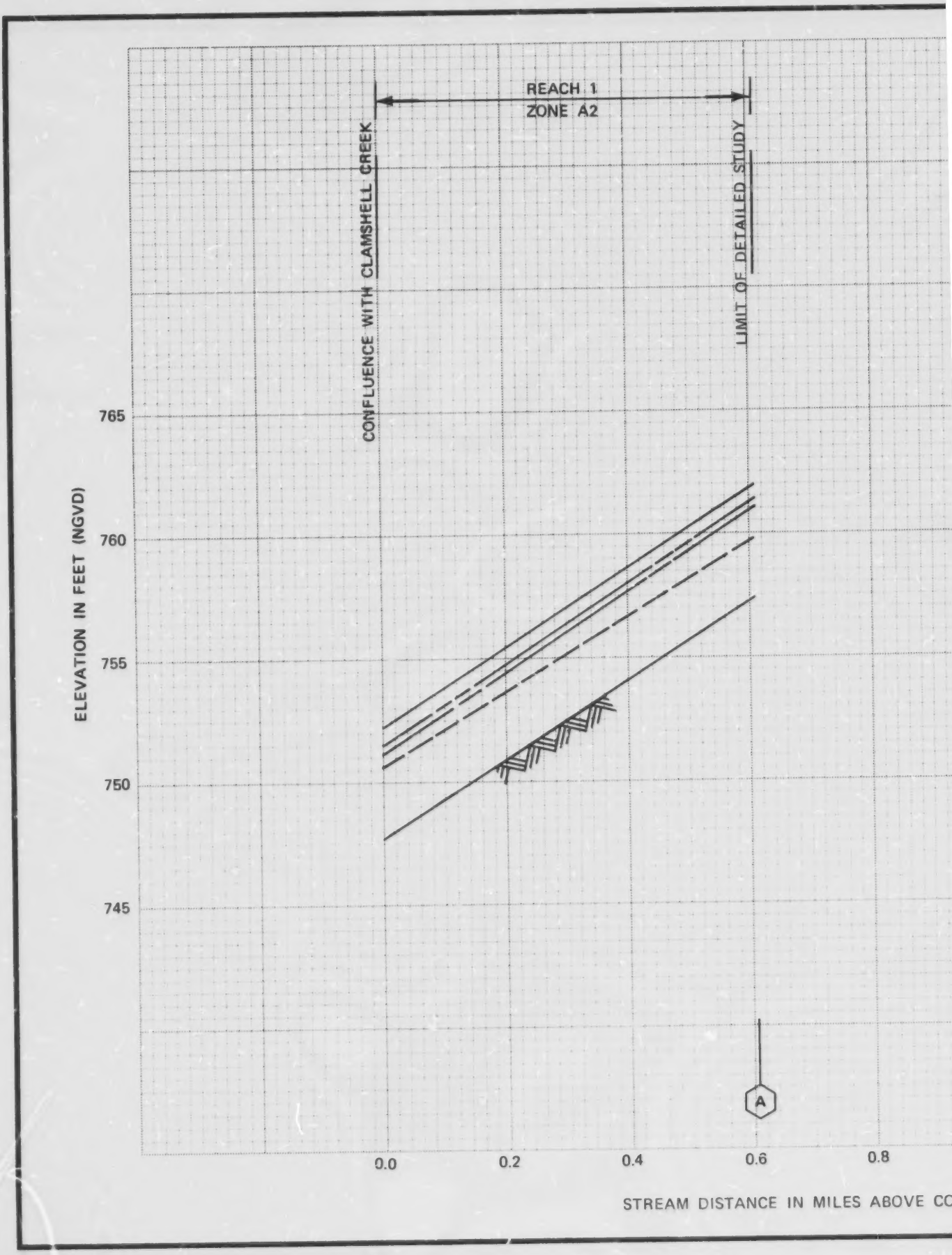
52


REACH 1
ZONE A2
CONFLUENCE WITH CLAMSHELL CREEK
LIMIT OF DETAILED STUDY
765
760
755
750
745
ELEVATION IN FEET (NGVD)
A
0.0
0.2
0.4
0.6
0.8
STREAM DISTANCE IN MILES ABOVE CO

LEGEND

500–YEAR FLOOD

100–YEAR FLOOD

50–YEAR FLOOD

10–YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

A

FLUENCE WITH CLAMSHELL CREEK

FLOOD PROFILES

WEST FORK CLAMSHELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI

(UNINCORPORATED AREAS)

08P

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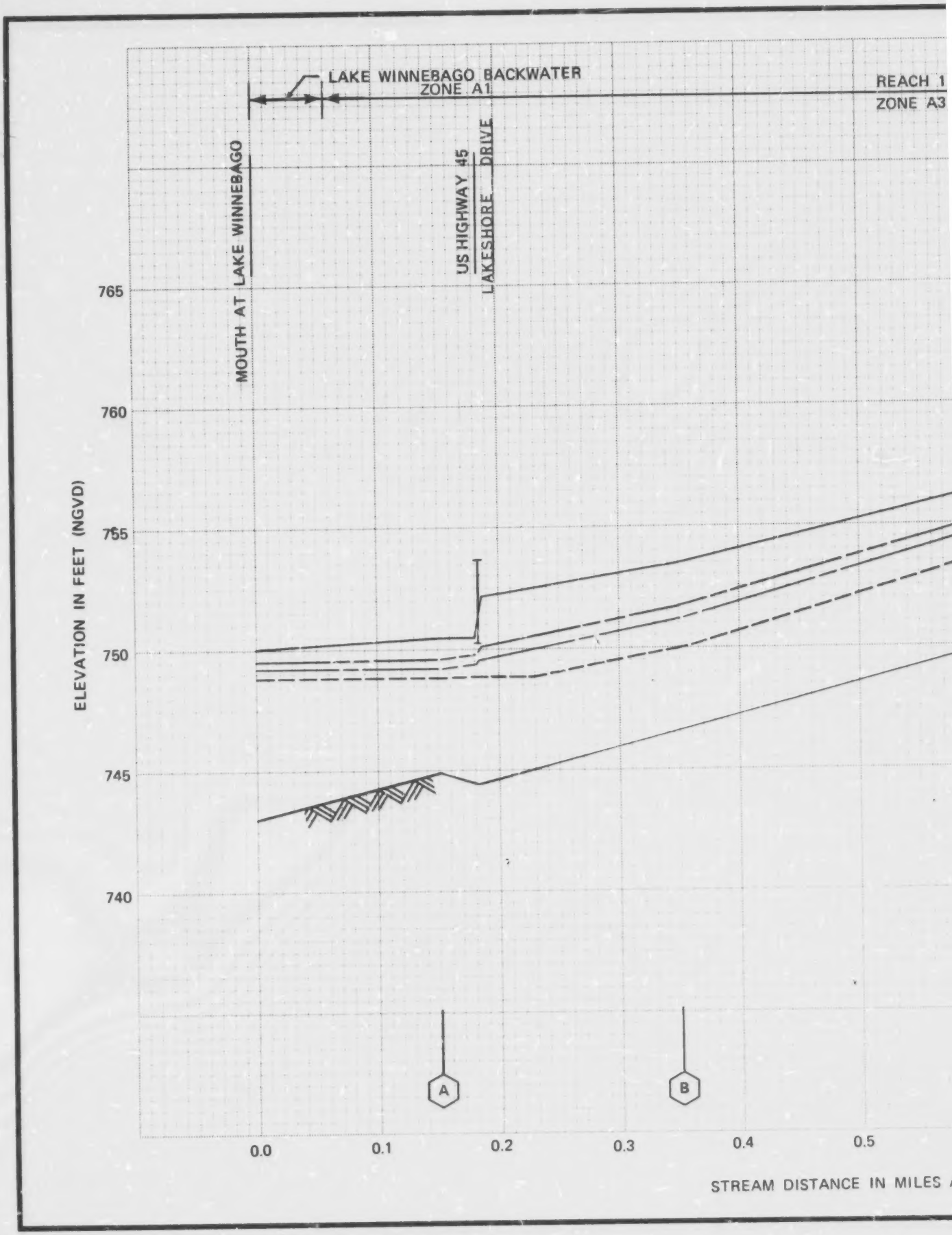
LAKE WINNEBAGO BACKWATER
ZONE A1
REACH 1
ZONE A3
MOUTH AT LAKE WINNEBAGO
US HIGHWAY 45
LAKESHORE DRIVE
765
760
755
750
745
740
ELEVATION IN FEET (NGVD)
A
B
0.0
0.1
0.2
0.3
0.4
0.5
STREAM DISTANCE IN MILES

FLOOD PROFILES

POPLAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

09P

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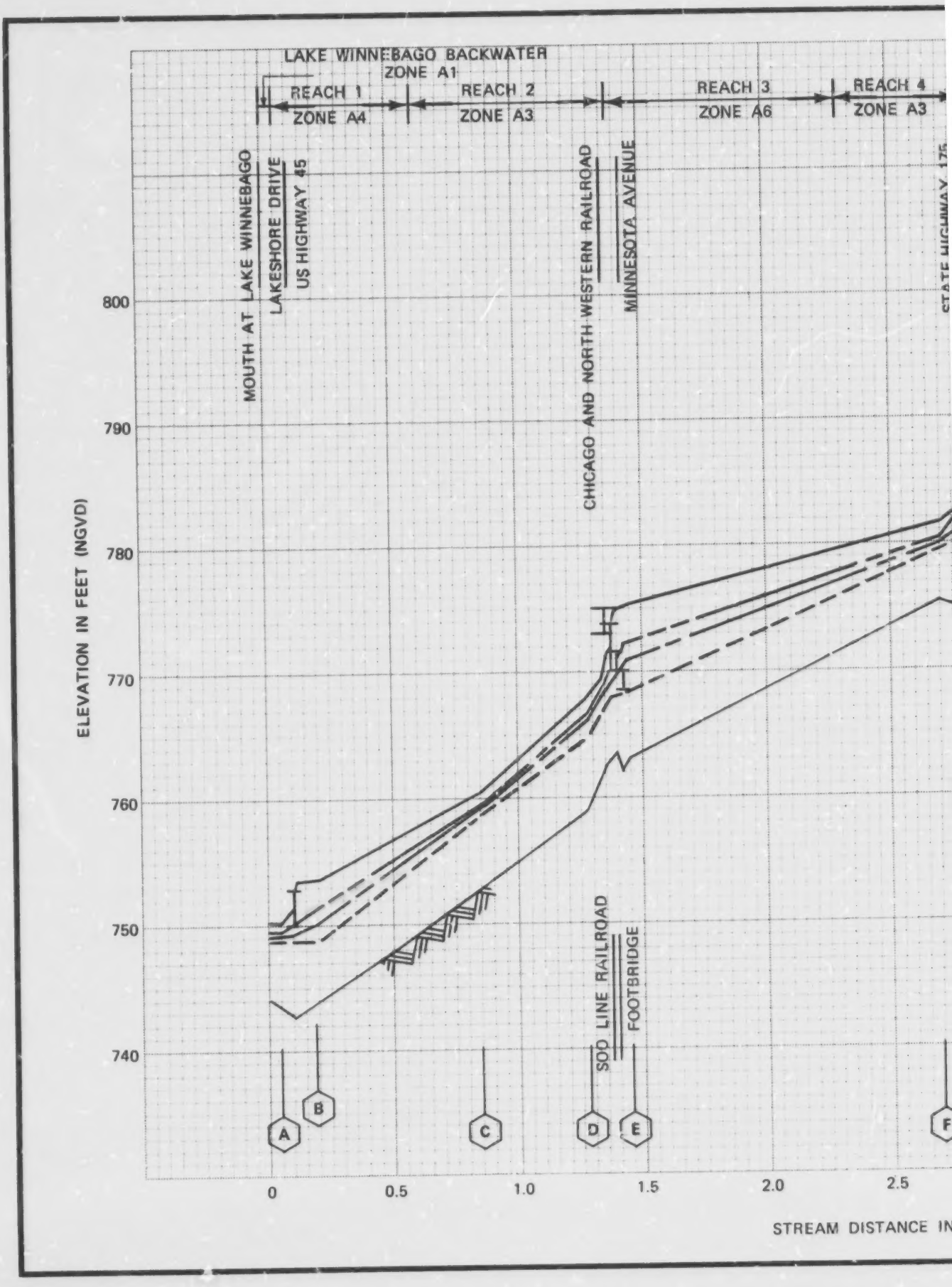
LAKE WINNEBAGO BACKWATER
ZONE A1
REACH 1
ZONE A4
REACH 2
ZONE A3
REACH 3
ZONE A6
REACH 4
ZONE A3
MOUTH AT LAKE WINNEBAGO
LAKESHORE DRIVE
US HIGHWAY 45
CHICAGO AND NORTH WESTERN RAILROAD
MINNESOTA AVENUE
ELEVATION IN FEET (NGVD)
800
790
780
770
760
750
740
SOO LINE RAILROAD
FOOTBRIDGE
A
B
C
D
E
F
0
0.5
1.0
1.5
2.0
2.5
STREAM DISTANCE IN

REACH 5
ZONE A4

REACH 6
ZONE A2

MELODY LANE

MELODY LANE

LIMIT OF DETAILED STUDY

G

H

I

3.0

3.5

4.0

MILES ABOVE MOUTH

LEGEND

500–YEAR FLOOD

100–YEAR FLOOD

50–YEAR FLOOD

10–YEAR FLOOD

STREAM BED

A

CROSS SECTION LOCATION

FLOOD PROFILES

ANDERSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

10P

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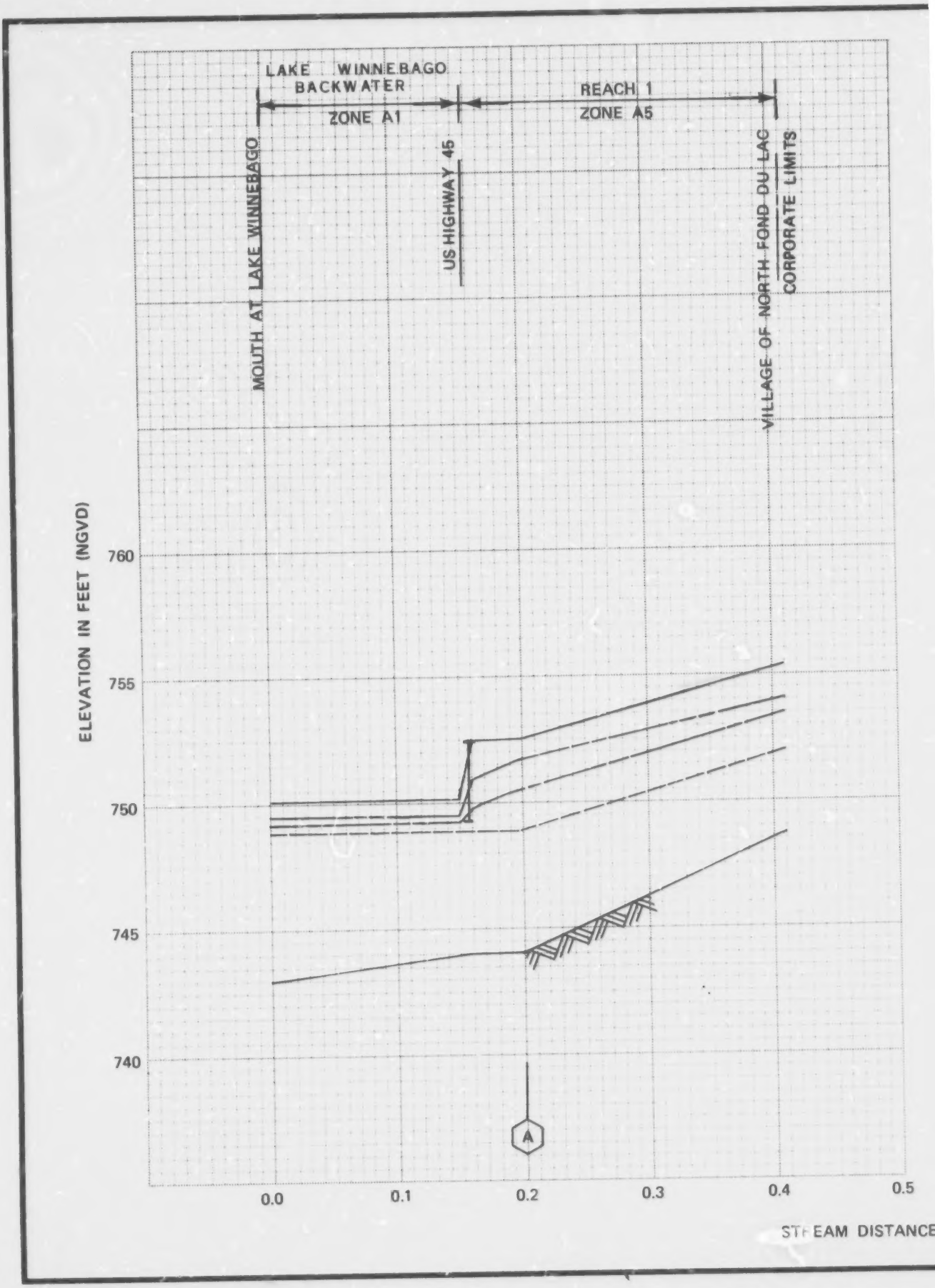
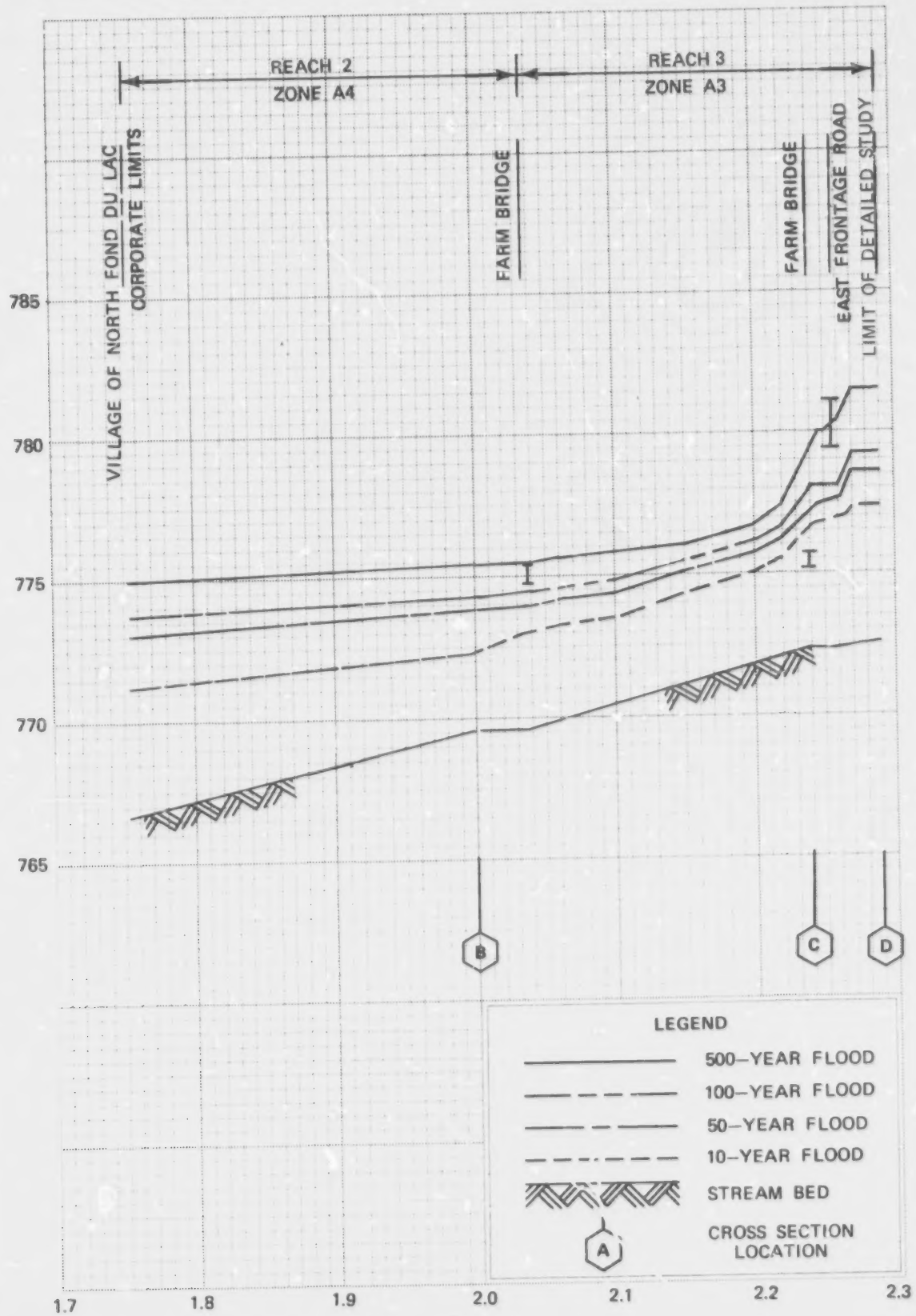

LAKE WINNEBAGO BACKWATER
ZONE A1
REACH 1
ZONE A5
MOUTH AT LAKE WINNEBAGO
US HIGHWAY 45
VILLAGE OF NORTH FOND DU LAC
CORPORATE LIMITS
ELEVATION IN FEET (NGVD)
760
755
750
745
740
A
0.0
0.1
0.2
0.3
0.4
0.5
STREAM DISTANCE



N MILES ABOVE MOUTH

FLOOD PROFILES

MOSHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

11P

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56

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REACH 1
ZONE A6
CITY OF FOND DU LAC
CORPORATE LIMITS
CHICAGO AND NORTH WESTERN
RAILROAD
SERVICE BRIDGE
VILLAGE OF NORTH FOND DU LAC
CORPORATE LIMITS
STATE HIGHWAY 175
CHICAGO AND NORTH WESTERN
RAILROAD
CORPORATE LIMITS
ELEVATION IN FEET (NGVD)
755
750
745
740
A
B
0.9
1.0
1.1
1.2
1.3
1.4
STREAM DISTANCE IN M

LEGEND

- 500–YEAR FLOOD
- 100–YEAR FLOOD
- 50–YEAR FLOOD
- 10–YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION (A)

ES ABOVE MOUTH

FLOOD PROFILES

SUPPLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

12P

57

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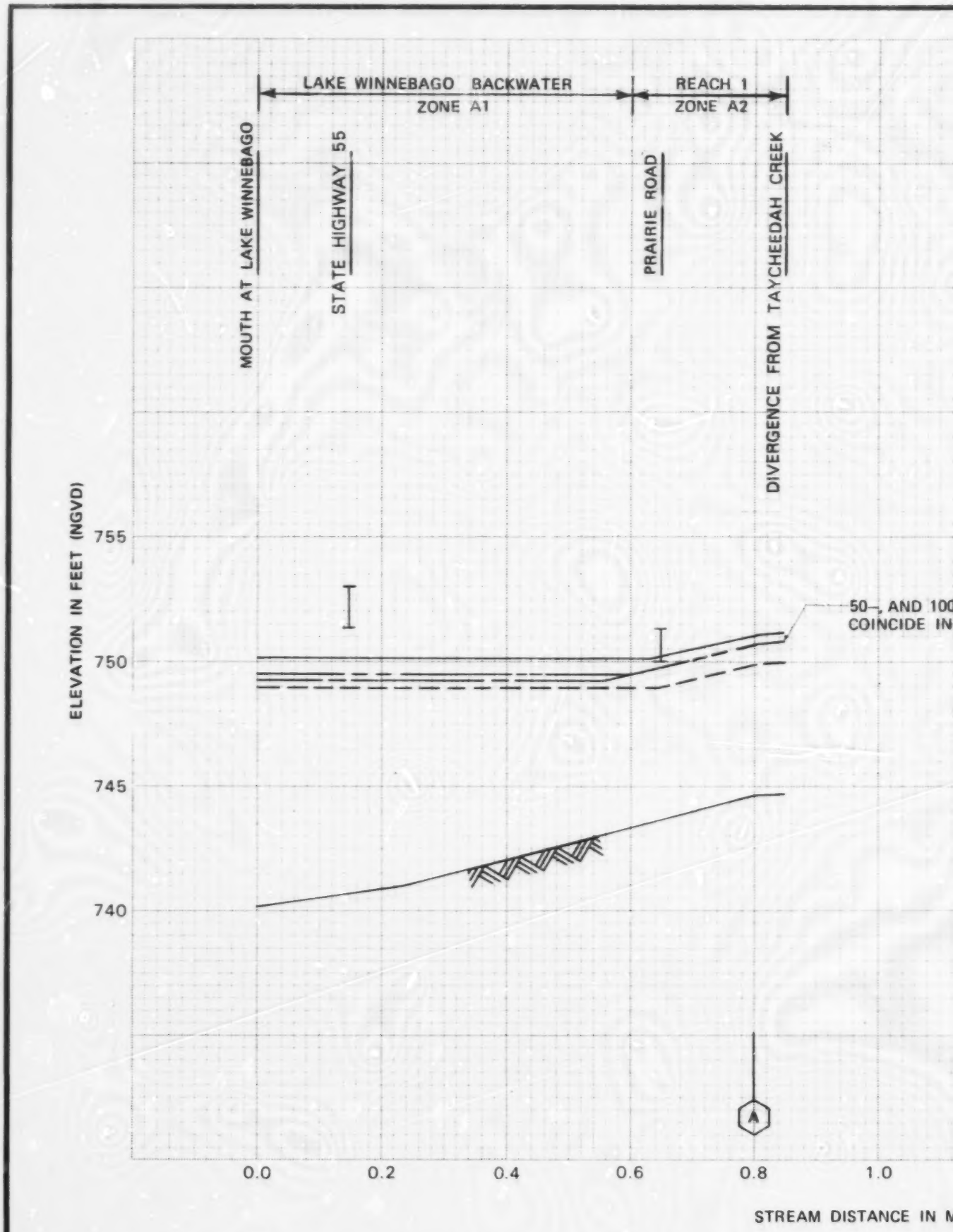
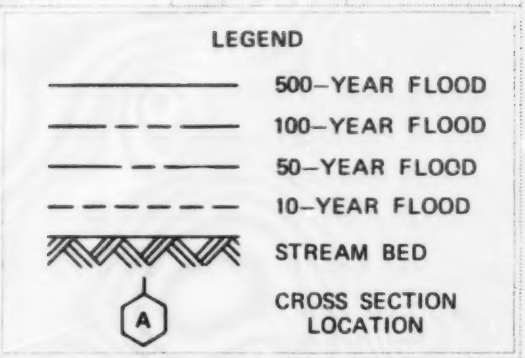

LAKE WINNEBAGO BACKWATER
ZONE A1
REACH 1
ZONE A2
MOUTH AT LAKE WINNEBAGO
STATE HIGHWAY 55
PRAIRIE ROAD
DIVERGENCE FROM TAYCHEEDAH CREEK
ELEVATION IN FEET (NGVD)
755
750
745
740
50-, AND 100
COINCIDE IN
0.0
0.2
0.4
0.6
0.8
1.0
STREAM DISTANCE IN M

YEAR
THIS REGION



LES ABOVE MOUTH

FLOOD PROFILES

LUCO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

13P

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58

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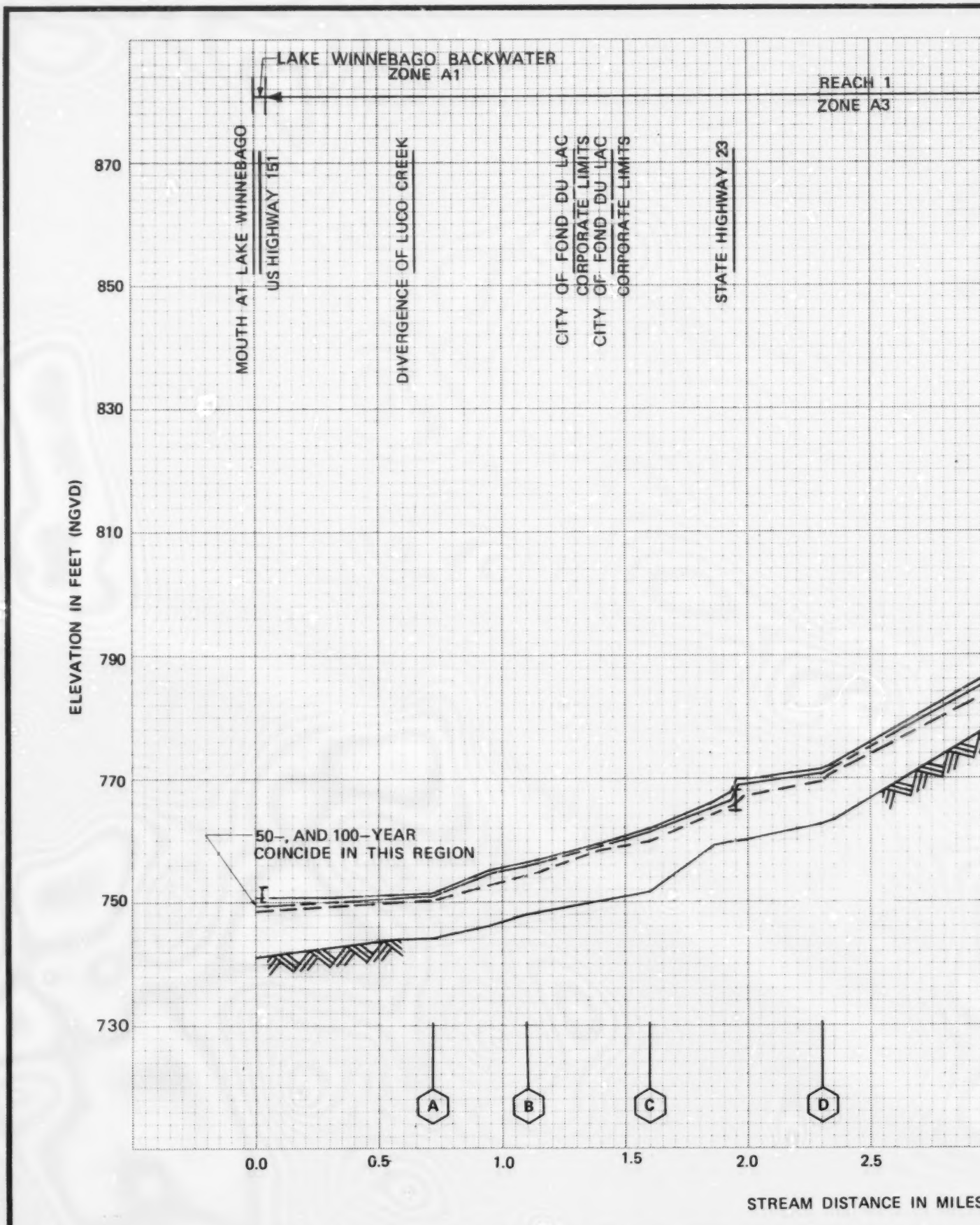
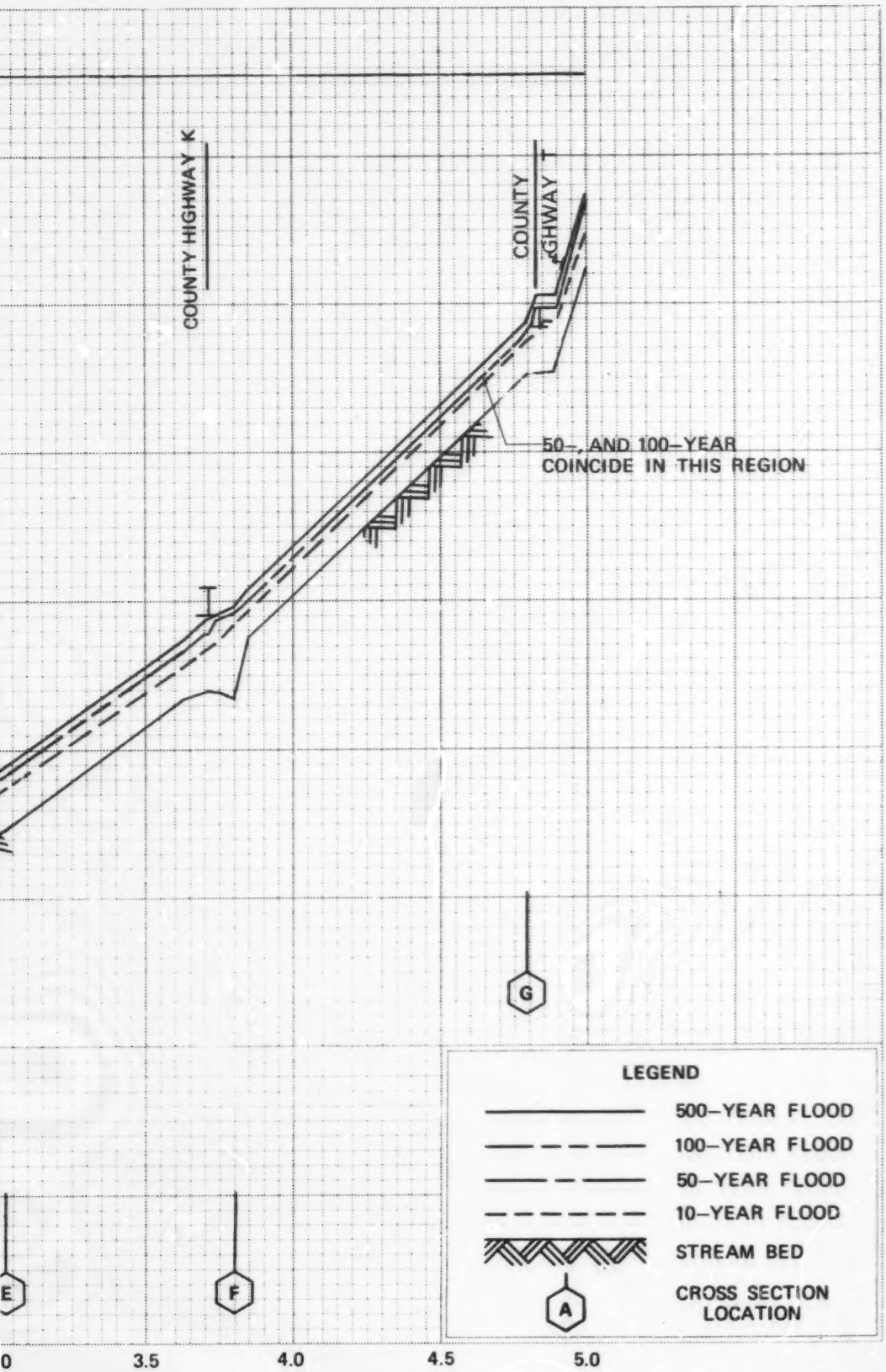

LAKE WINNEBAGO BACKWATER
ZONE A1
REACH 1
ZONE A3
MOUTH AT LAKE WINNEBAGO
US HIGHWAY 151
DIVERGENCE OF LUCO CREEK
CITY OF FOND DU LAC
CORPORATE LIMITS
CITY OF FOND DU LAC
CORPORATE LIMITS
STATE HIGHWAY 23
ELEVATION IN FEET (NGVD)
870
850
830
810
790
770
750
730
50-, AND 100-YEAR
COINCIDE IN THIS REGION
A
B
C
D
0.0
0.5
1.0
1.5
2.0
2.5
STREAM DISTANCE IN MILES



FLOOD PROFILES

TAYCHEEDAH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

14P

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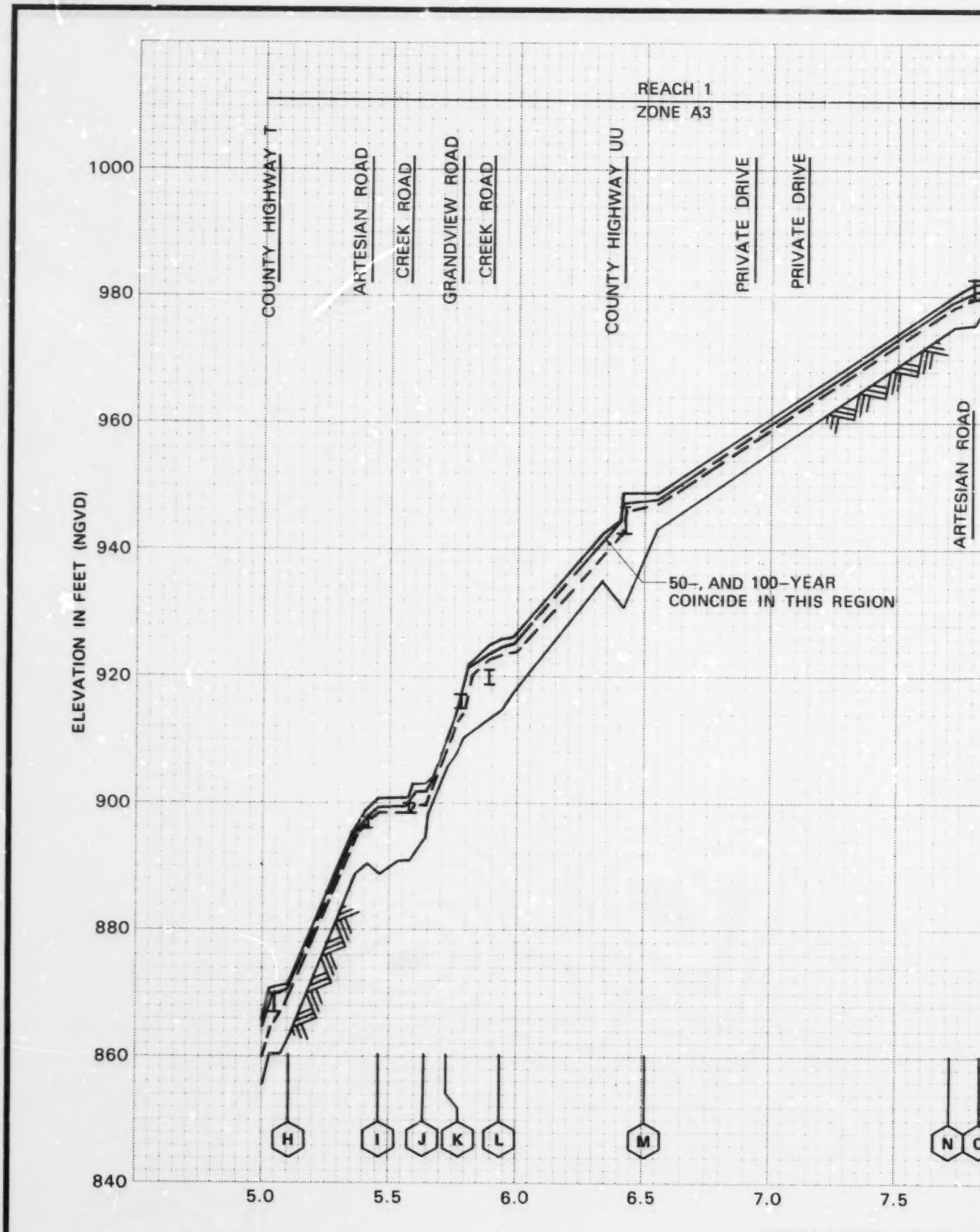
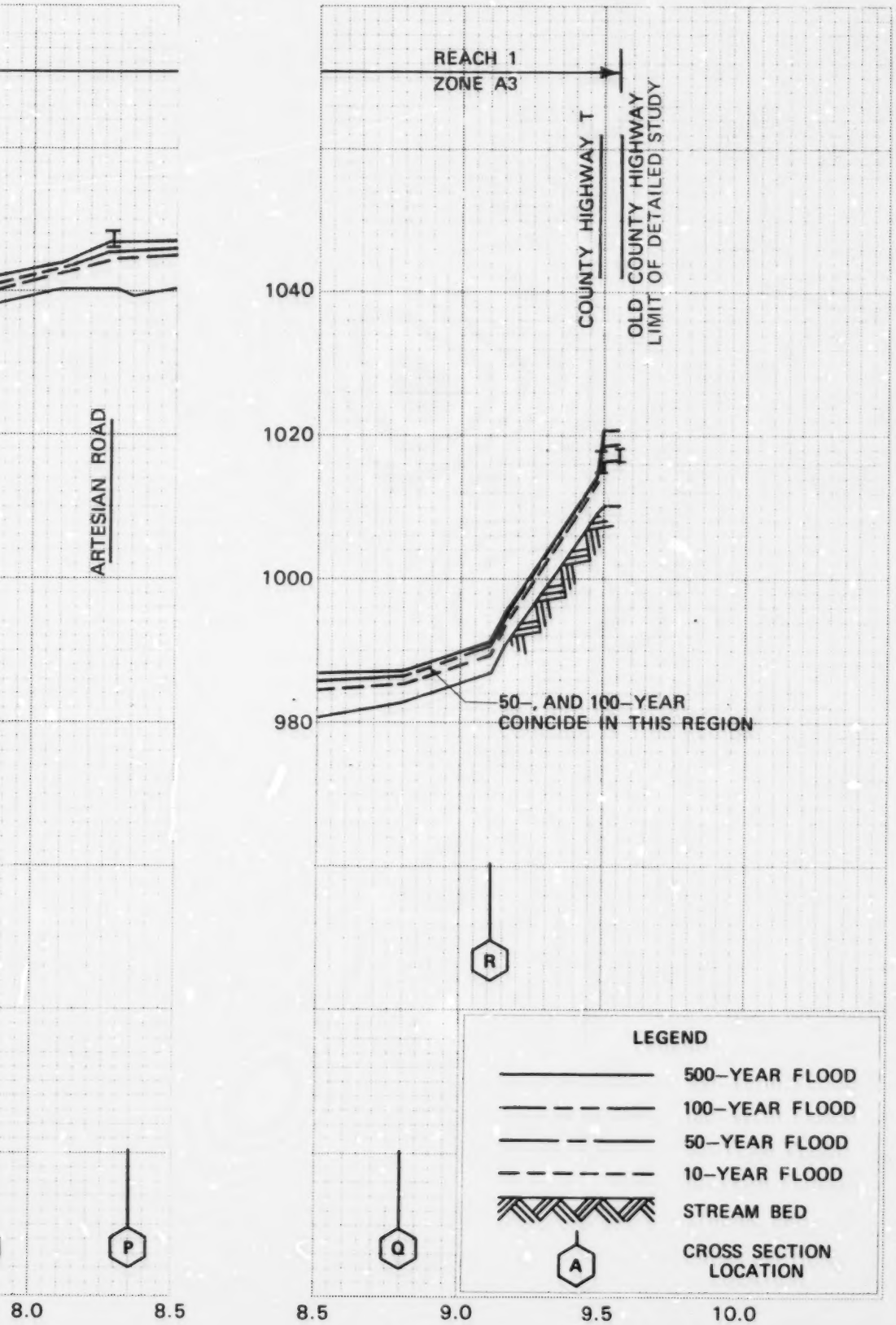

REACH 1
ZONE A3
COUNTY HIGHWAY T
ARTESIAN ROAD
CREEK ROAD
GRANDVIEW ROAD
CREEK ROAD
COUNTY HIGHWAY UU
PRIVATE DRIVE
PRIVATE DRIVE
ARTESIAN ROAD
50–, AND 100–YEAR
COINCIDE IN THIS REGION
ELEVATION IN FEET (NGVD)
1000
980
960
940
920
900
880
860
840
5.0
5.5
6.0
6.5
7.0
7.5
H
I
J
K
L
M
N
STREAM DISTANCE IN MI



FLOOD PROFILES

TAYCHEEDAH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

15P

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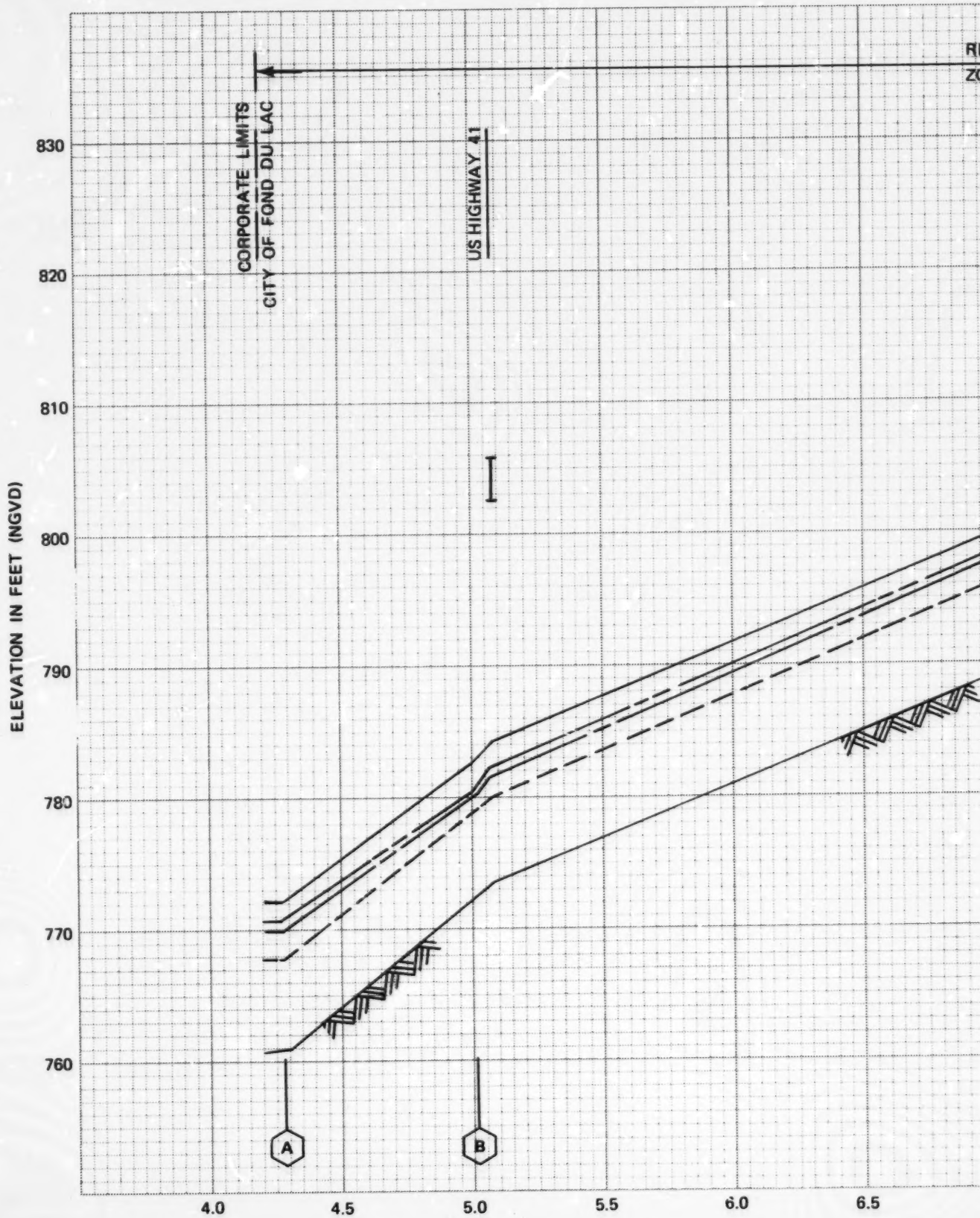
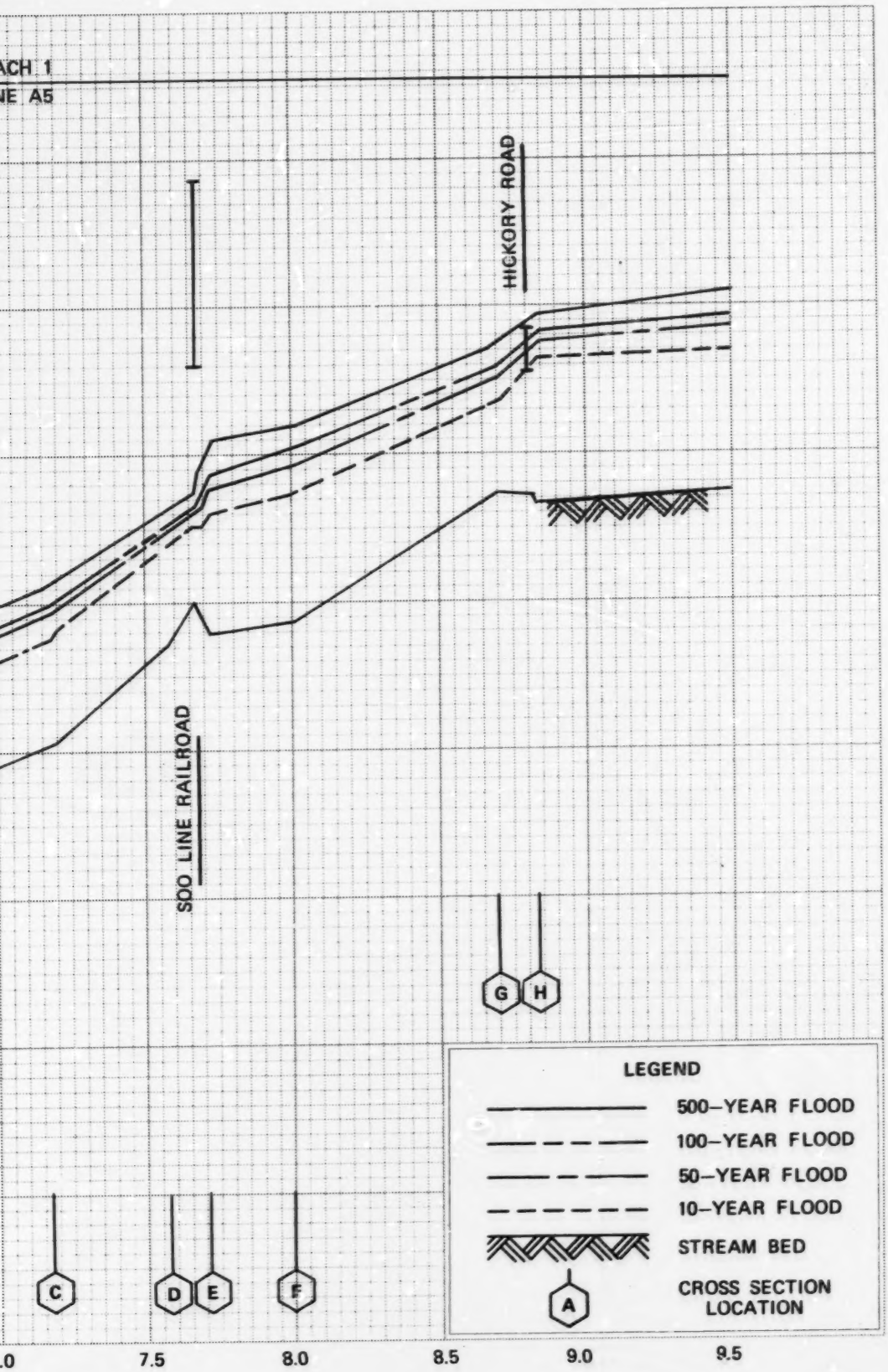

CORPORATE LIMITS
CITY OF FOND DU LAC
US HIGHWAY 41
ELEVATION IN FEET (NGVD)
830
820
810
800
790
780
770
760
A
B
4.0
4.5
5.0
5.5
6.0
6.5
STREAM DISTANCE IN MIL



FLOOD PROFILES

EAST BRANCH FOND DU LAC RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

16P

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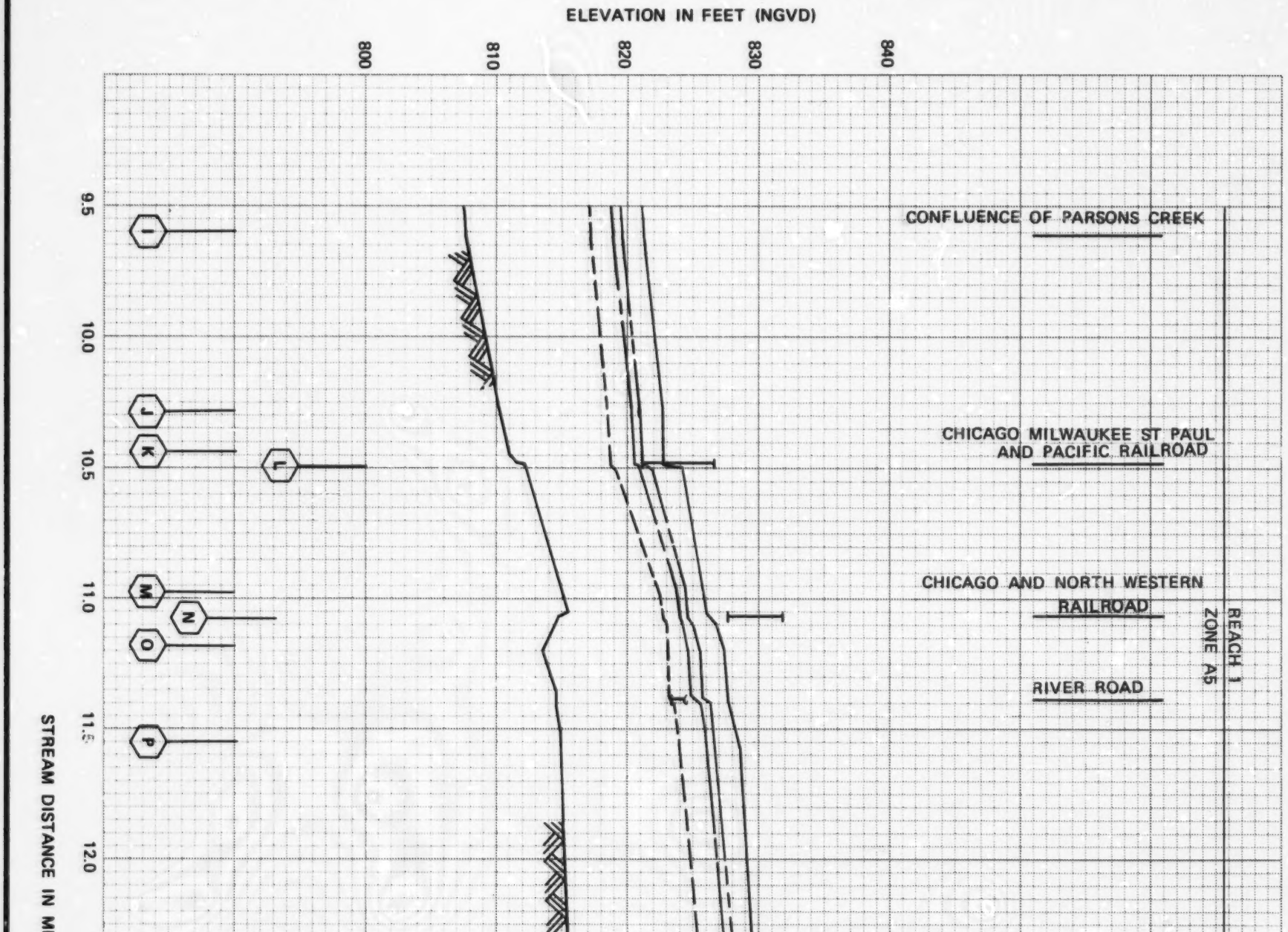
ELEVATION IN FEET (NGVD)
800
810
820
830
840
STREAM DISTANCE IN MILES
9.5
10.0
10.5
11.0
11.5
12.0
I
J
K
L
M
N
O
P
CONFLUENCE OF PARSONS CREEK
CHICAGO MILWAUKEE ST PAUL AND PACIFIC RAILROAD
CHICAGO AND NORTH WESTERN RAILROAD
RIVER ROAD
REACH 1
ZONE A5

LIMIT OF DETAILED STUDY

P

12.5 13.0

ES ABOVE MOUTH

LEGEND

500–YEAR FLOOD

100–YEAR FLOOD

50–YEAR FLOOD

10–YEAR FLOOD

STREAM BED

A CROSS SECTION LOCATION

FLOOD PROFILES

EAST BRANCH FOND DU LAC RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI

(UNINCORPORATED AREAS)

17P

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62

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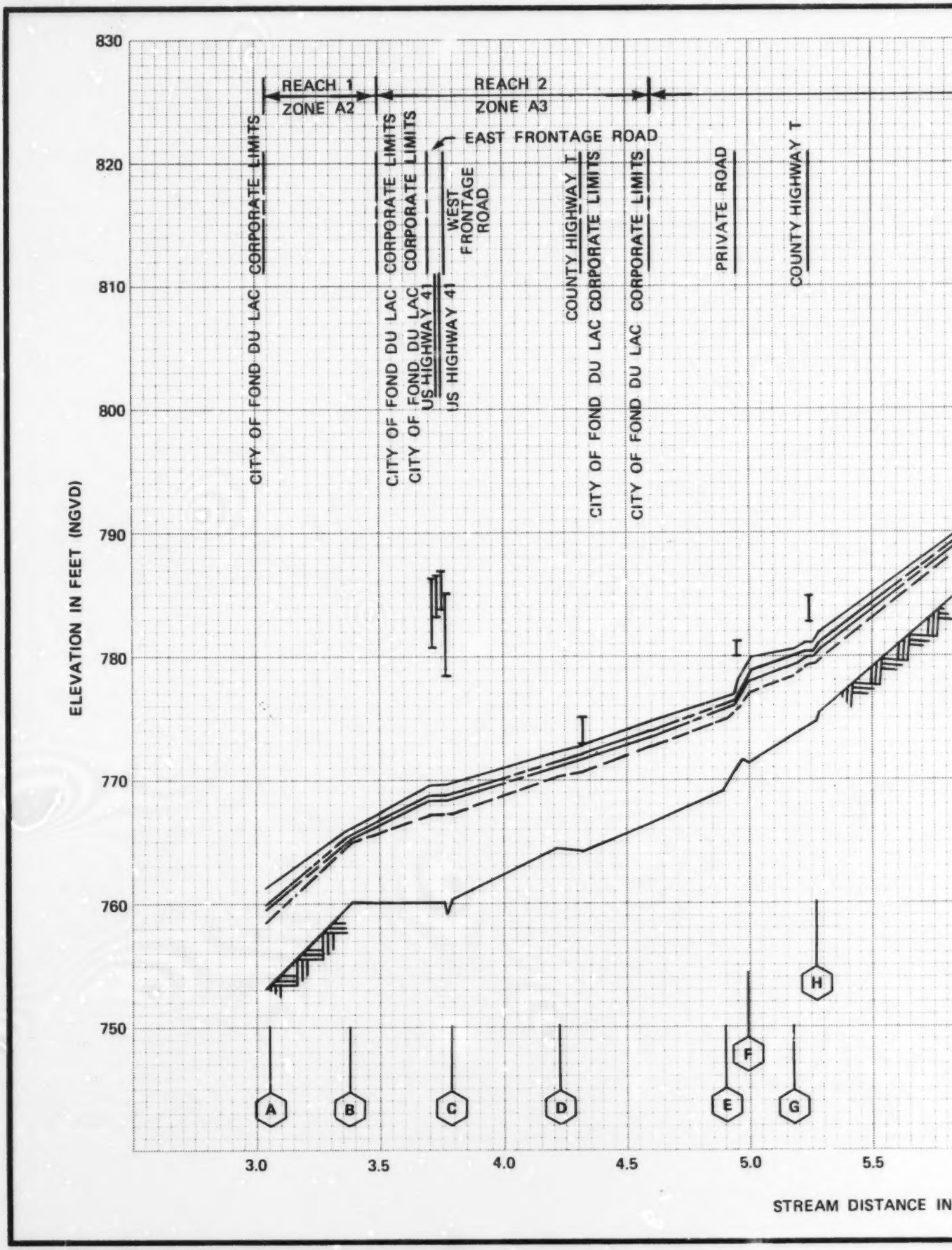
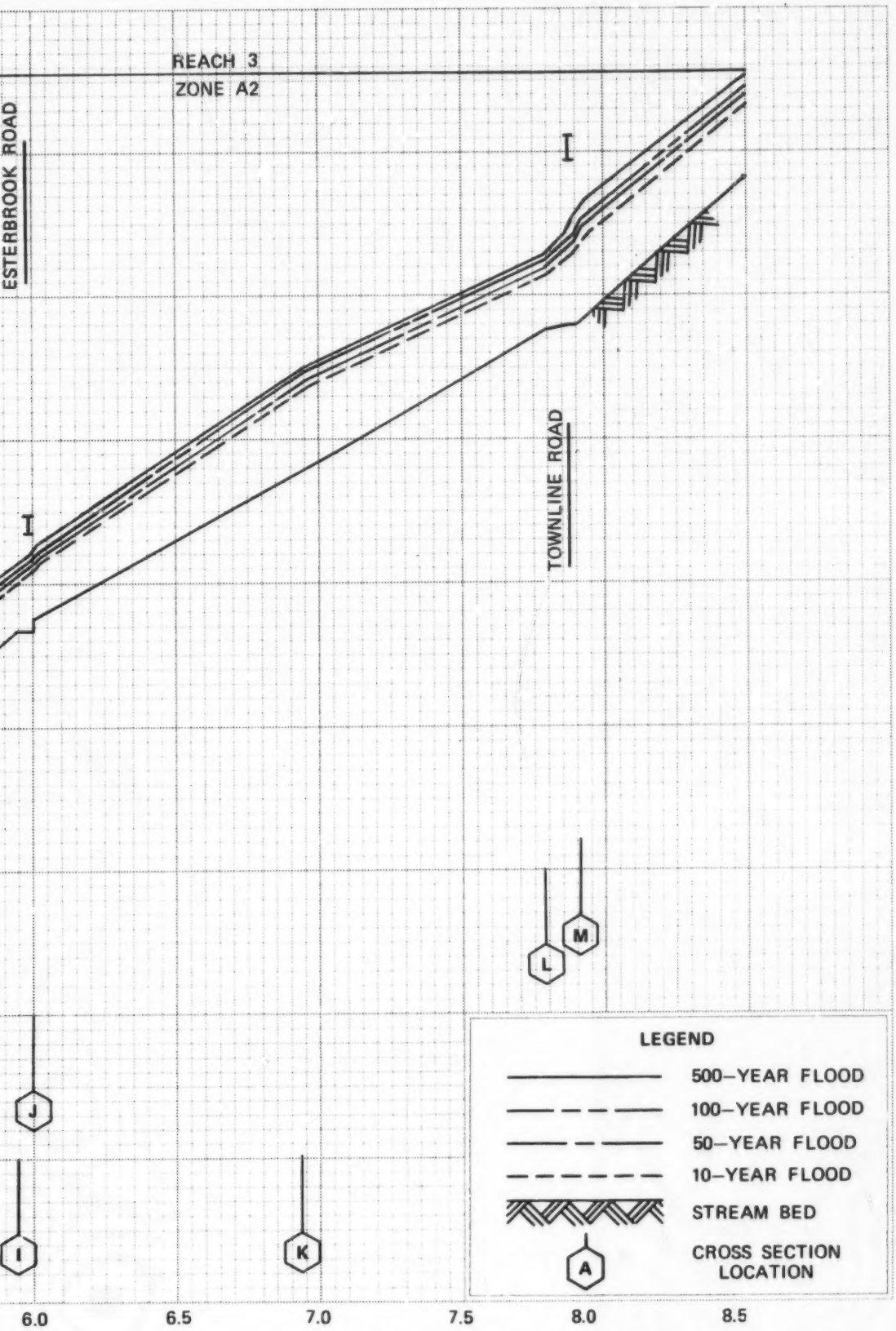

REACH 1
ZONE A2
REACH 2
ZONE A3
EAST FRONTAGE ROAD
CITY OF FOND DU LAC CORPORATE LIMITS
CITY OF FOND DU LAC CORPORATE LIMITS
US HIGHWAY 41
WEST FRONTAGE ROAD
COUNTY HIGHWAY T
CITY OF FOND DU LAC CORPORATE LIMITS
CITY OF FOND DU LAC CORPORATE LIMITS
PRIVATE ROAD
COUNTY HIGHWAY T
ELEVATION IN FEET (NGVD)
830
820
810
800
790
780
770
760
750
A
B
C
D
E
F
G
H
3.0
3.5
4.0
4.5
5.0
5.5
STREAM DISTANCE IN



FLOOD PROFILES

WEST BRANCH FOND DU LAC RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

18P

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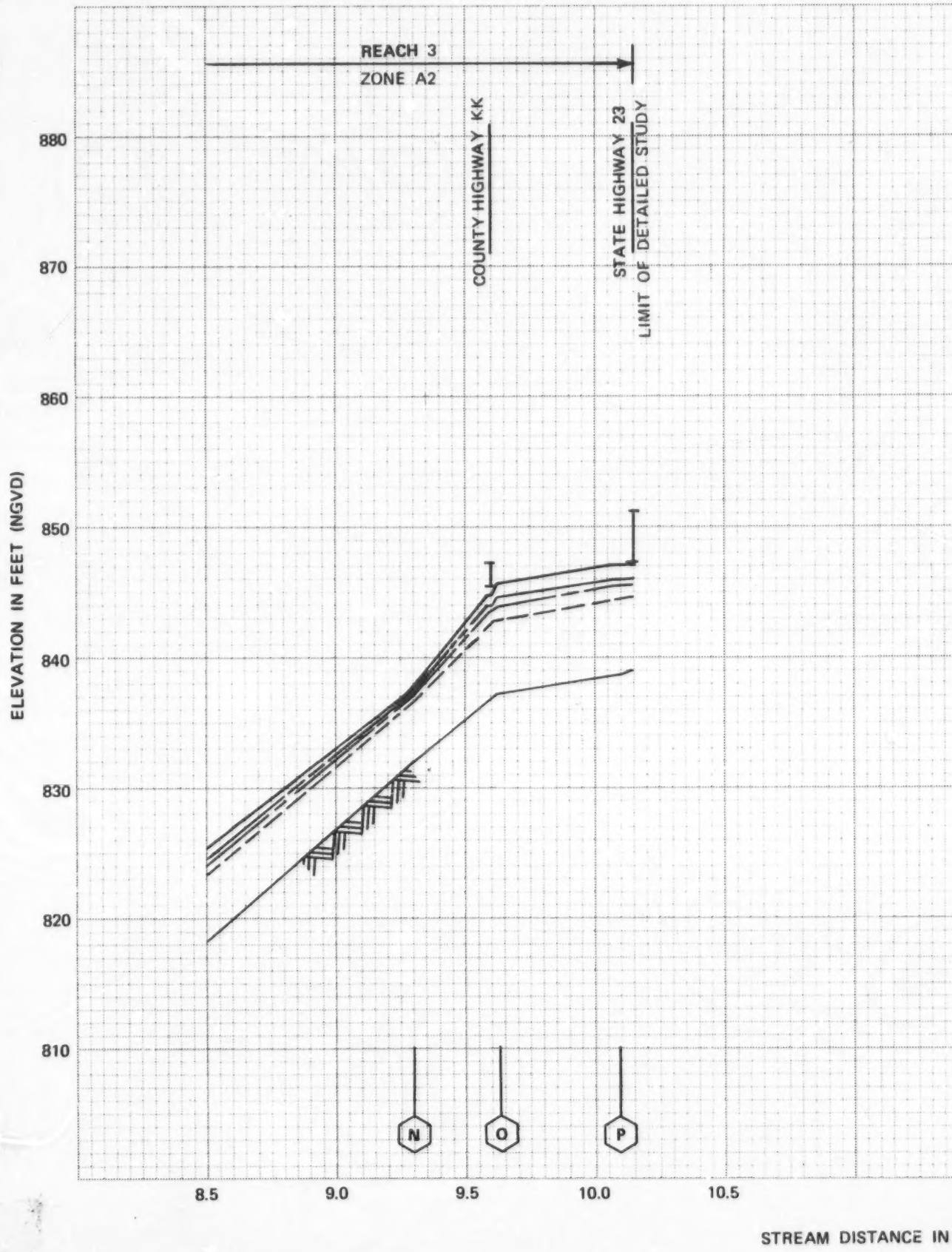
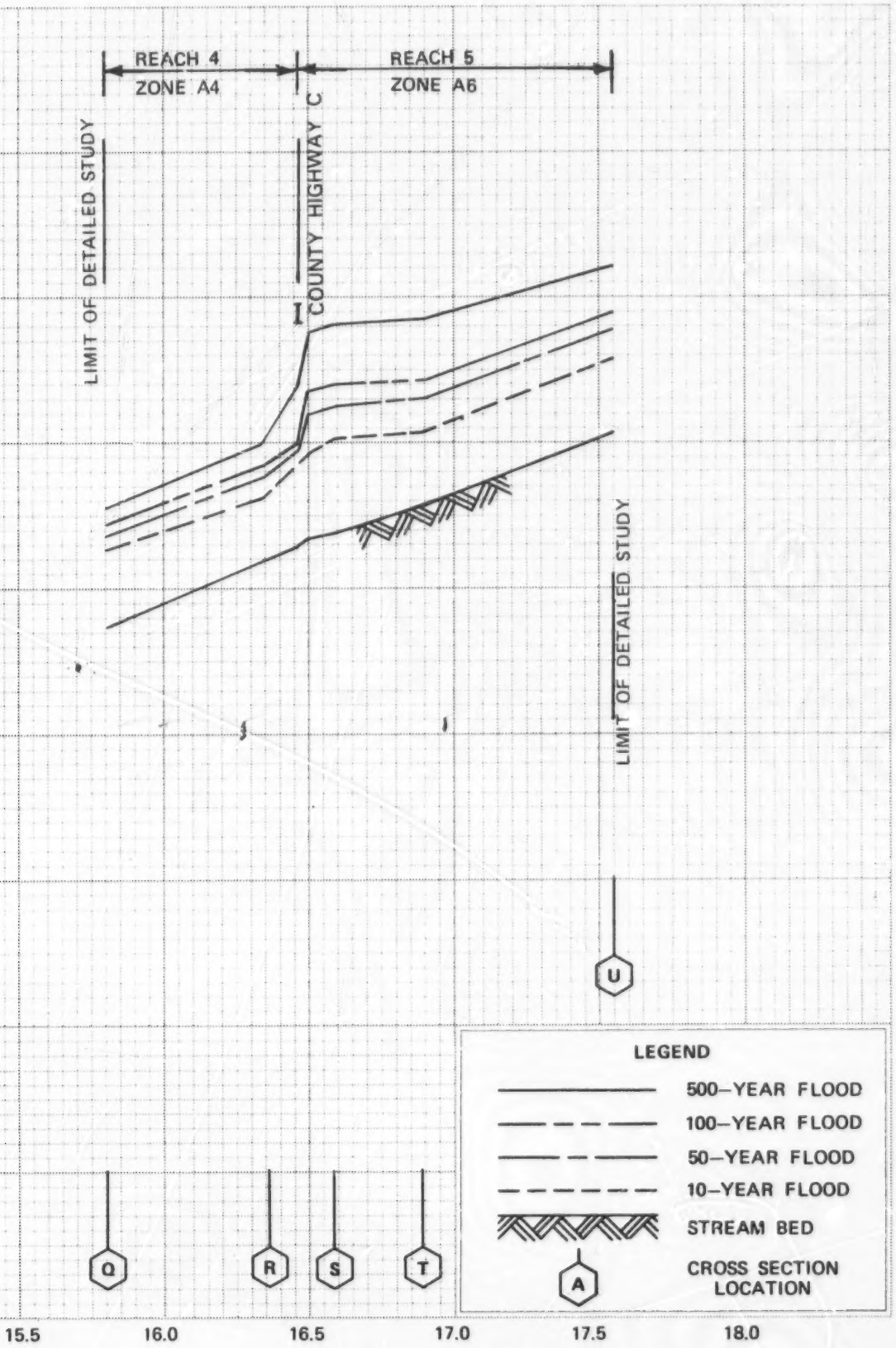

REACH 3
ZONE A2
COUNTY HIGHWAY KK
STATE HIGHWAY 23
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NGVD)
880
870
860
850
840
830
820
810
N
O
P
8.5
9.0
9.5
10.0
10.5
STREAM DISTANCE IN



FLOOD PROFILES

WEST BRANCH FOND DU LAC RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

19P

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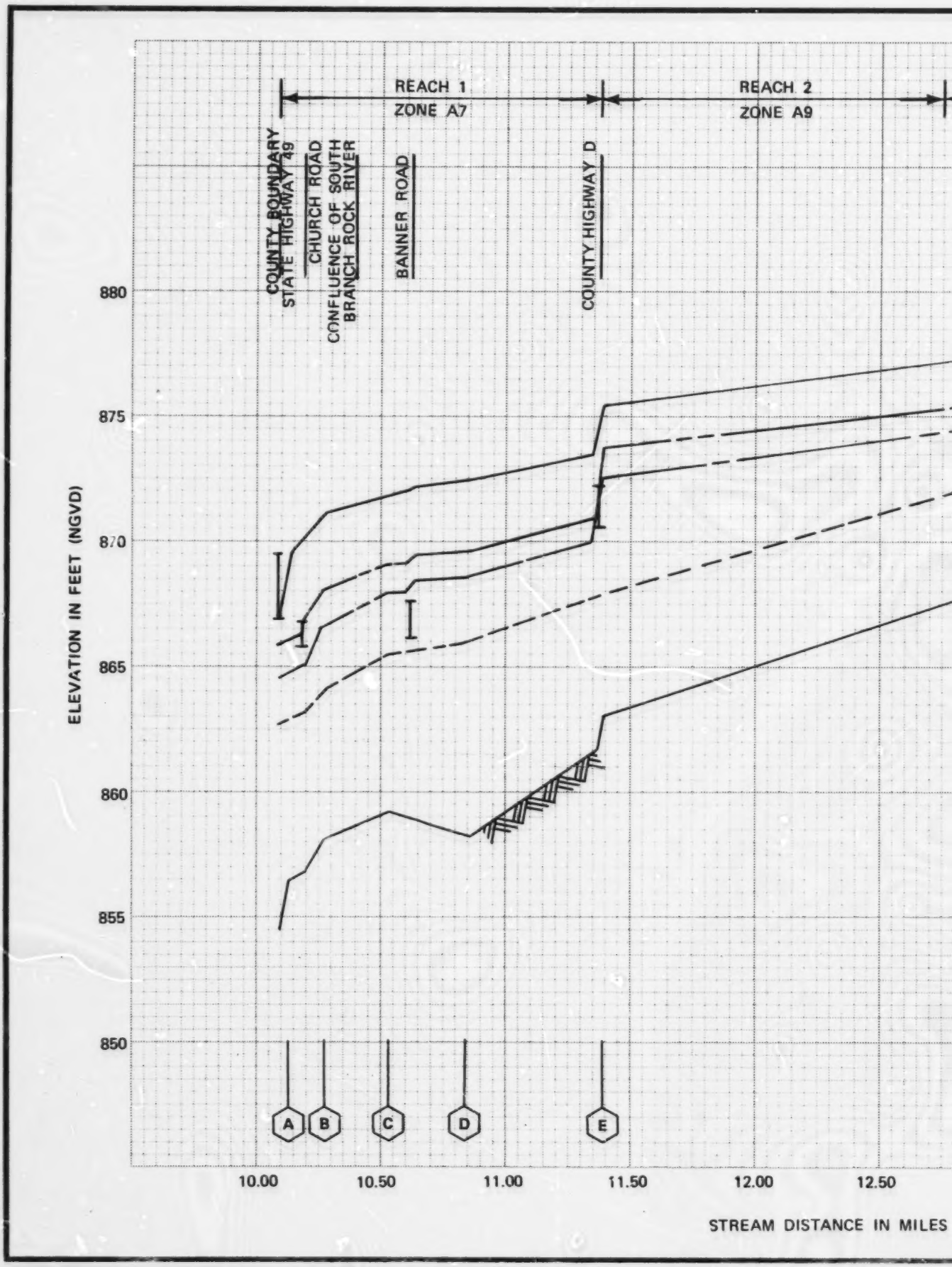
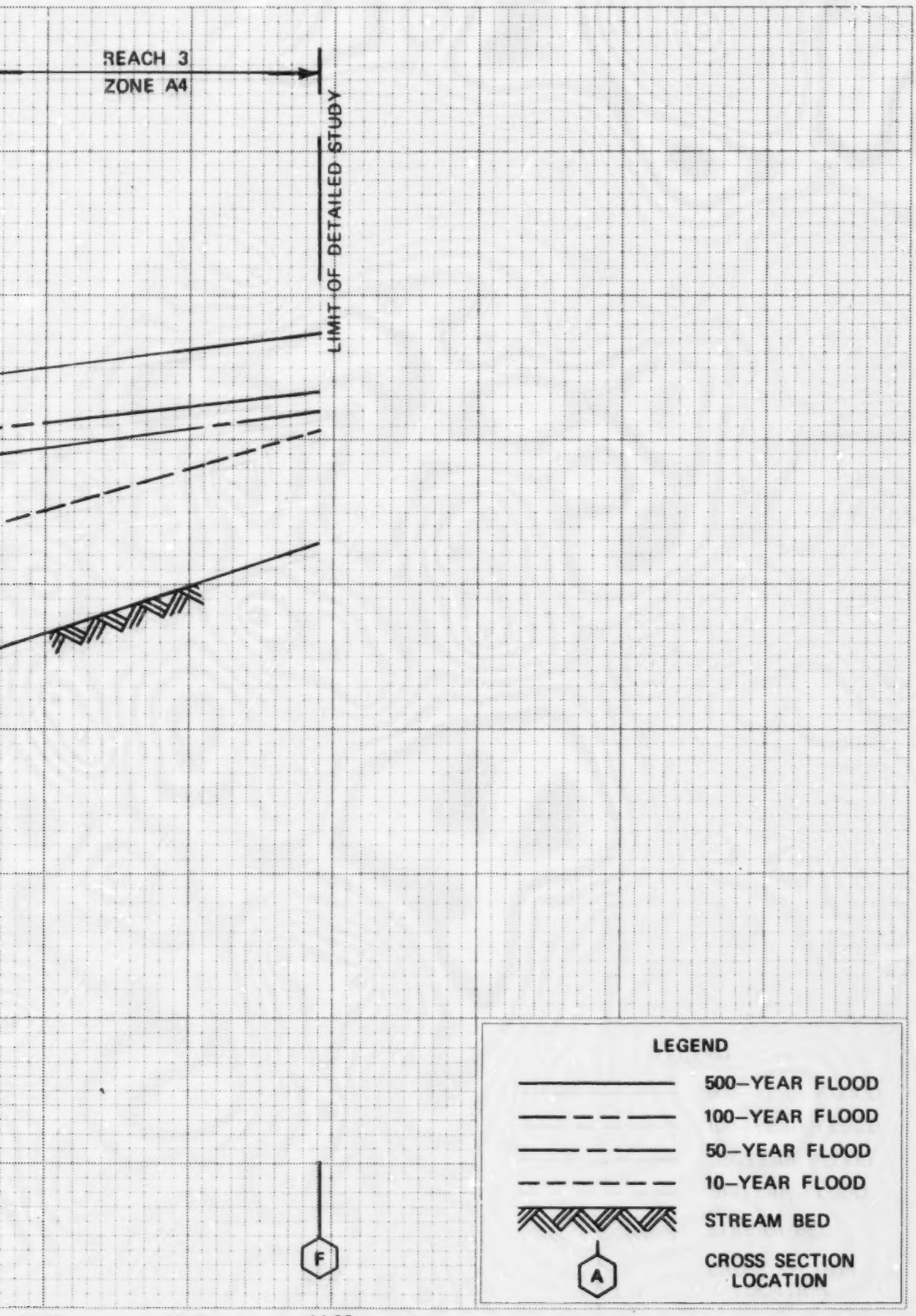

REACH 1
ZONE A7
REACH 2
ZONE A9
COUNTY BOUNDARY
STATE HIGHWAY 49
CHURCH ROAD
CONFLUENCE OF SOUTH BRANCH ROCK RIVER
BANNER ROAD
COUNTY HIGHWAY D
ELEVATION IN FEET (NGVD)
880
875
870
865
860
855
850
A
B
C
D
E
10.00
10.50
11.00
11.50
12.00
12.50
STREAM DISTANCE IN MILES



FLOOD PROFILES

WEST BRANCH ROCK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI

(UNINCORPORATED AREAS)

20P

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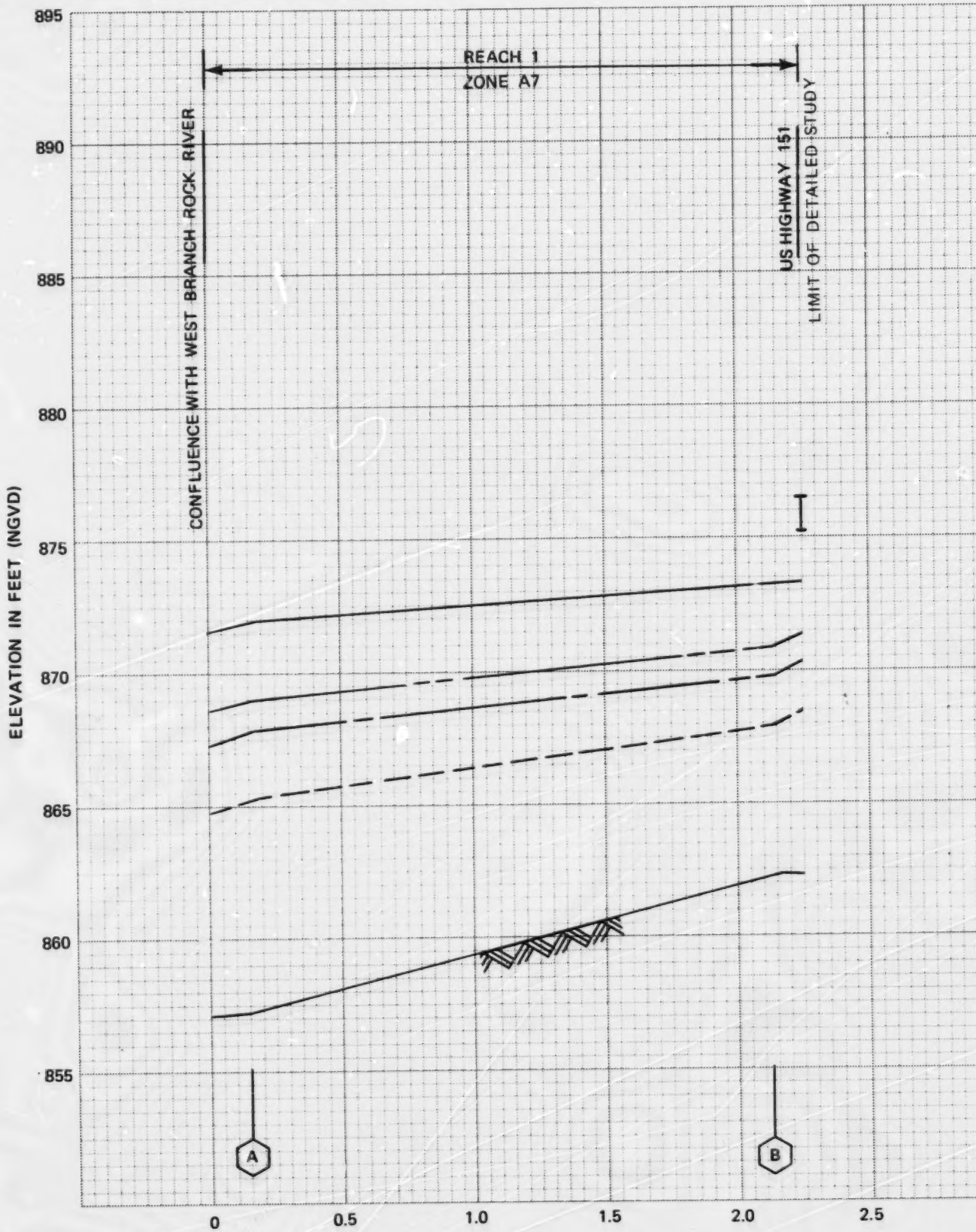
REACH 1
ZONE A7
CONFLUENCE WITH WEST BRANCH ROCK RIVER
US HIGHWAY 151
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NGVD)
895
890
885
880
875
870
865
860
855
A
B
0
0.5
1.0
1.5
2.0
2.5
STREAM DISTANCE IN MILES ABOVE CONFL

REACH 2
ZONE A6

LIMIT OF DETAILED STUDY

LIMIT OF FLOODING AFFECTING COMMUNITY

CITY OF WAUPUN CORPORATE LIMITS

CITY OF WAUPUN CORPORATE LIMITS

CITY OF WAUPUN CORPORATE LIMITS

C

LEGEND

500–YEAR FLOOD

100–YEAR FLOOD

50–YEAR FLOOD

10–YEAR FLOOD

STREAM BED

A

CROSS SECTION LOCATION

3.0 3.5 4.0 4.5 5.0 5.5

ENCE WITH WEST BRANCH ROCK RIVER

FLOOD PROFILES

SOUTH BRANCH ROCK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

21P

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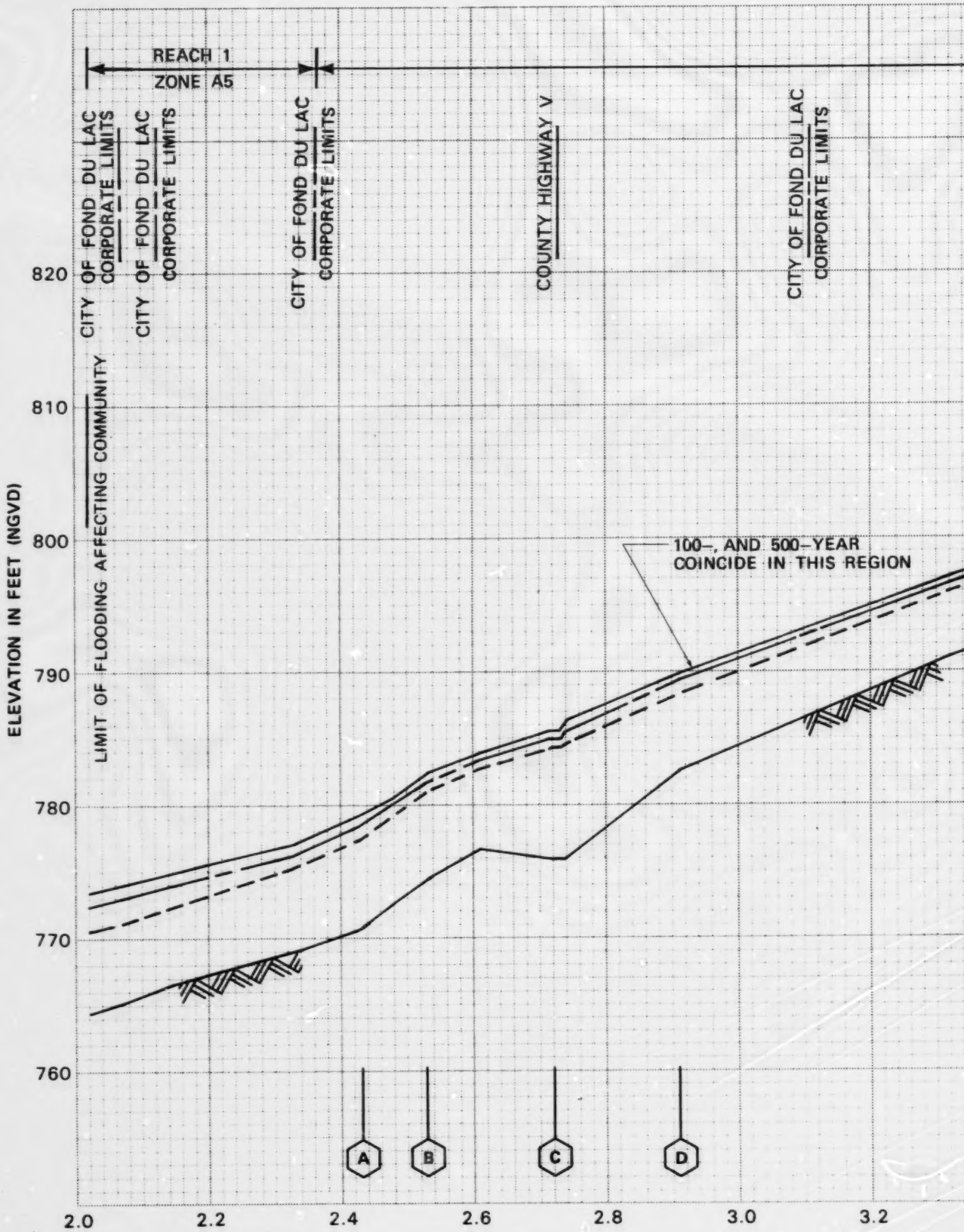
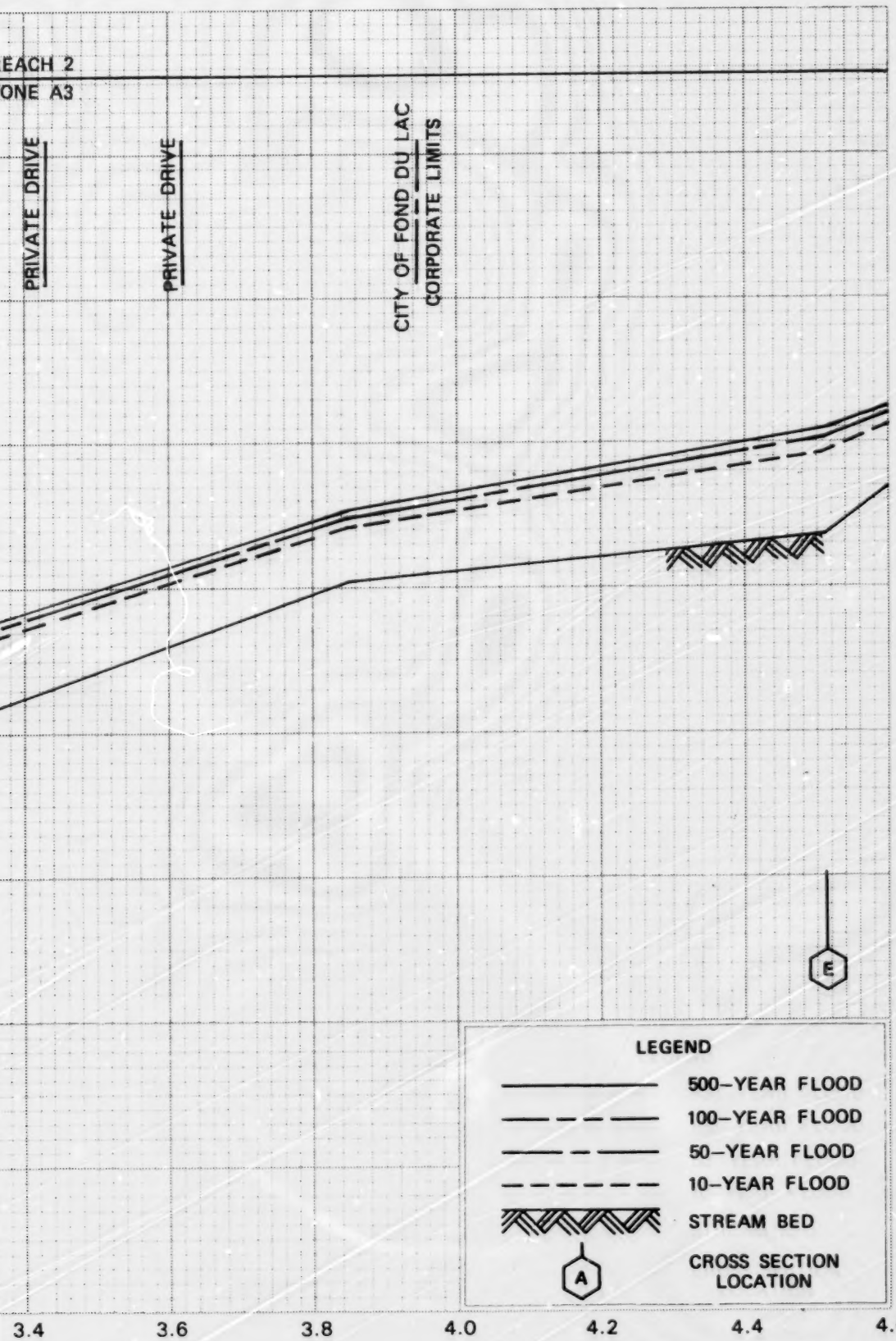
66


REACH 1
ZONE A5
LIMIT OF FLOODING AFFECTING COMMUNITY
CITY OF FOND DU LAC CORPORATE LIMITS
CITY OF FOND DU LAC CORPORATE LIMITS
CITY OF FOND DU LAC CORPORATE LIMITS
COUNTY HIGHWAY V
CITY OF FOND DU LAC CORPORATE LIMITS
100-, AND 500-YEAR COINCIDE IN THIS REGION
ELEVATION IN FEET (NGVD)
820
810
800
790
780
770
760
A
B
C
D
2.0
2.2
2.4
2.6
2.8
3.0
3.2
STREAM DISTANCE IN MI



FLOOD PROFILES

DE NEVEU CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

22P

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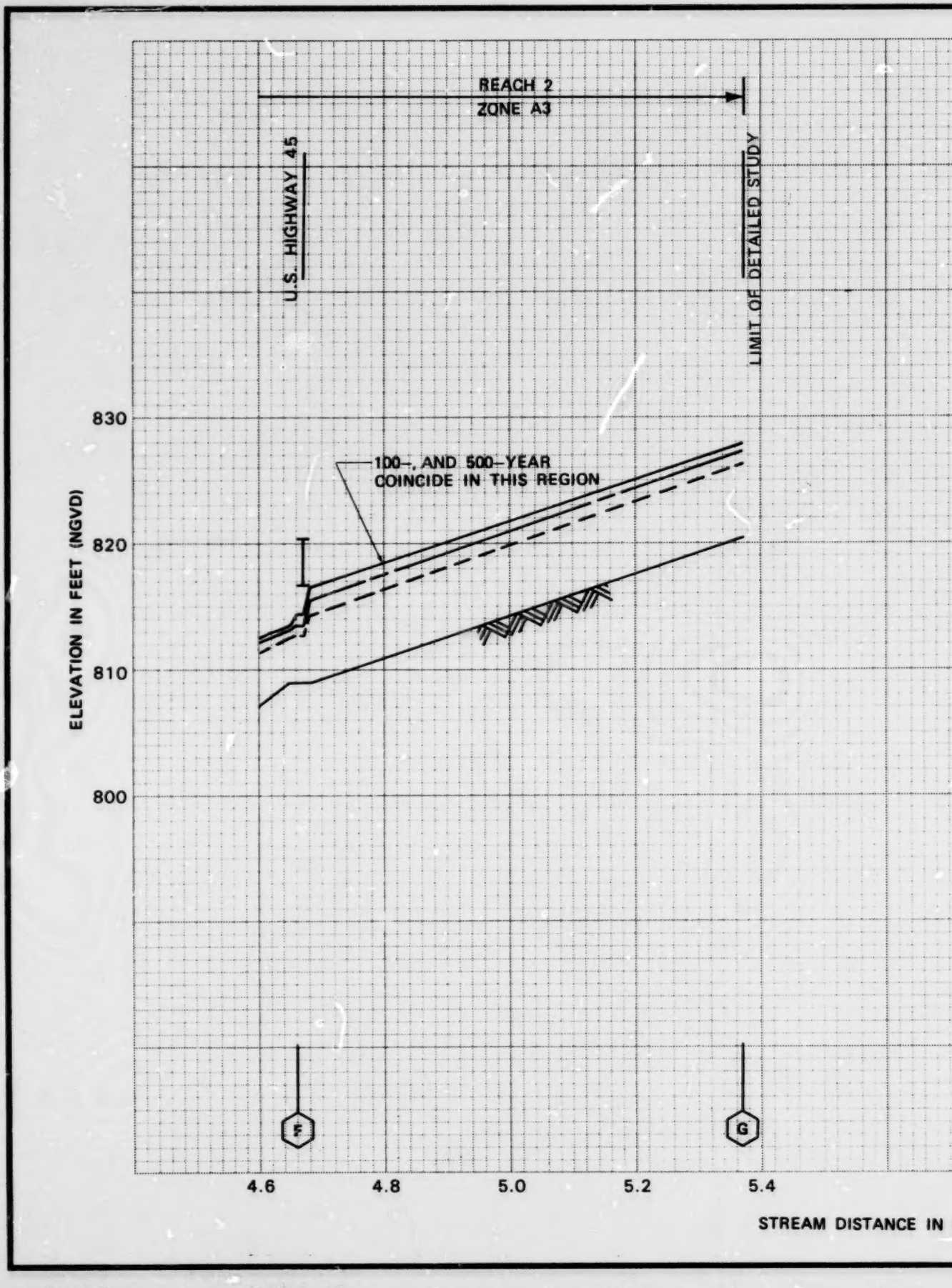
REACH 2
ZONE A3
U.S. HIGHWAY 45
LIMIT OF DETAILED STUDY
100-, AND 500-YEAR
COINCIDE IN THIS REGION
ELEVATION IN FEET (NGVD)
830
820
810
800
F
G
4.6
4.8
5.0
5.2
5.4
STREAM DISTANCE IN

ILES ABOVE MOUTH

FLOOD PROFILES

DE NEVEU CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOND DU LAC COUNTY, WI
(UNINCORPORATED AREAS)

23P

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68.

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